ON THE GENUS BOSWELLIA

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PREFACE.

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THE following paper is owing to the establishment in Bombay of the Victoria and Albert Museum and Victoria Gardens. A museum of the Economic Products and Natural History of Western India, and for the illustration of general Economic Processes, was first organized in Bombay by the late George Buist, LL.D., F.R.S. This was the Government Central Museum, of which the learned Dr. Buist was the first Curator. The Rev. A. G. Fraser, D.D., LL.D., succeeded him. The collections made by them were lodged in the Town Barracks, and on the breaking out of the Bengal Mutiny were altogether destroyed, owing to the ascendancy at that moment of the military in India. A Brigadier threw the Museum out of window. In the same year Lord Elphinstone appointed me Curator, telling me, very properly, that my first care must be to get a building for the collections which I had to reorganize. This led to the establishment of the Victoria and Albert Museum and Victoria Gardens. The Agri-Horticultural Society of Bombay had been founded in 1830, and had a garden at Sayrie, near Bombay; but on the Victoria and Albert Museum being determined on, the Society proposed to lay out a new garden in Bombay, provided the Museum were built in it. All this was done.

The Garden, adorned (besides the Museum) with Coalbrookdale Gates, a canopied Statue of the Queen, a Clock-tower, a Triumphal Arch, a Fountain, and Greek Temples, is now chiefly maintained by the Municipality of Bombay. The Museum, which is to be adorned with Statues of the late Prince Consort and the late Honourable Jugonnathjee Sunkersett, who, with my friend Dr. Bhau Daji, may be particularly named as its founders, is supported solely by Government. The cost of the Museum and Gardens has been about £100,000.

Sir Bartle Frere, in laying the chief corner stone of the Museum in the Victoria Gardens on the 19th of November, 1862, said:—"Let us remember, this Museum is designed to be no mere collection of rarities and curiosities, at which crowds may gaze in vacant and resultless astonishment; you have purposed that it shall be a great engine of education. In the words which you have so aptly quoted from the great Lawgiver of scientific research, a 'College of Inquiry,' as distinguished from a 'College of Reading.' Here, as in a microcosm, you will collect specimens of whatever in Art or Nature ministers to man's wants or occupies man's thoughts. The student will here read, not through the imperfect medium of language, but in the products themselves visibly placed before him, the history, so far as human eye can trace it, of each wondrous process and product of Nature! He will trace, step by step, how the intellect of man, in various ages and in various countries, has turned those processes and products to human use, and how Art has striven to impart to the result of her labours some

what of that divine image, of those more than human characteristics of beauty, variety, perfection, and adaptation for which the rudest of mankind ever yearn, and which the most civilized never fully attain to! It seems to me a happy resolve that you have placed this building in the Gardens of the Agri-Horticultural Society. The student of the Museum will thus find himself ever in the presence of Nature in her richest and most varied forms. Such an association must be favourable, not only in supplying the materials of study, but in inducing the frame of mind in which the inquirer is most likely to reach the truth. The narrow dogmatism and self-sufficient pride, which more than any thing else are obstacles to the perception of truth, must stand rebuked in view of the multiform power and beauty of Nature, as seen in the vegetation of a tropical garden; and man, who in the midst of the crowded city has some excuse for fancying himself Lord of the Creation, will here feel that he can only command Nature by obeying her laws."

What leisure I had, whilst in Bombay, for scientific work, I devoted to the collection and identification of the vegetable products of Western India. The Museum gums and resins were mostly gathered with my own hands. Such confusion had existed regarding the botanical sources of Indian gums and resins, that the value of such a collection as the Victoria and Albert Museum possesses will be at once appreciated, as also the necessity of its being kept with scientific care. I also prepared a catalogue (the work of six years) of the vegetable products which the Museum contains. It now remains for me, in my retirement, to write a series of monographs, of which the present paper is the first, on such of the vegetable products of the East, the history and botany of which need further elucidation. But above all I have meant to prepare the materials for a Chemist. It is the Chemist who is now wanted in India; and I hope that, as has always been intended from the first, I may be succeeded in the charge of the Victoria and Albert Museum by an analytical Chemist. The opening of the south-western shores of Asia, through the Suez Canal, to the active coasting trade of the Mediterranean countries, makes it very necessary for us to use every means for developing the commercial resources of India; while none would possibly prove more advantageous and important than the study of the chemistry of its products on the spot, and with all the facilities of a Museum standing in a great Botanical Garden, such as we have in Bombay. I urge this here, because I feel under a personal responsibility to urge it everywhere. I find that men in Government are in these days as loth to govern in small things as in great[1]. Nor is the establishment of a College of Economic Inquiry at Bombay a small thing. And then there is that old story of the Sibyl's books.

"A preface to a book is a usual, often agreeable, but by no means a necessary precursor"[2].

G. B.

Ushas[3], Friday, in Lide, 1870.

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[1] "Magna Dii curant, parva negligunt." "At tamen minora Dii negligunt . . . . ne in regnis quidem reges omnia minima curant."—Cicero *De N. D.*

[2] Keightley's 'Fairy Mythology,' Preface.

[3] Rig-Veda (H. H. Wilson's translation), i. 274:—"The divine and ancient Ushas, born again and again, and bright with unchanging hues, wastes away the life of a mortal."

[*Extracted from the* TRANSACTIONS OF THE LINNEAN SOCIETY OF LONDON, vol. xxvii.]

On the Genus Boswellia, *with Descriptions and Figures of three new Species.*

By GEORGE BIRDWOOD, *M.D. Edinburgh. Communicated by* DANIEL HANBURY, *Esq., F.R.S. & L.S.*

(Plates XXIX.–XXXII.)

Read April 1st, 1869.

I OFFER here the descriptions of three new species of *Boswellia*, natives of the Soumali country. The characters of one of them make it, I believe, necessary that the characters hitherto given of the genus *Boswellia* should be reconsidered; and hence the first part of the title which I have, very reluctantly, given to this paper. Another of these plants, all of which yield frankincense, yields, I believe, the bulk of the olibanum of commerce. And I believe that the discovery of these plants settles at last the controversy which has gone on for ages concerning frankincense.

The offering of incense on altars, and in cups and closed censers, is represented in painting and in sculpture on the monuments of Egypt and Assyria; but although incense, as a rule, implies frankincense, and these representations might with more or less plausibility be interpreted by the Jewish ritual, they merely record the contemporaneous use of incense. We are expressly told by Herodotus that frankincense was excluded from the balsamic substances used in the preparation of the mummies of the Egyptians; but although this might perhaps have been because of its being sacred to the service of their gods, still the first undoubted record of the use of frankincense, and the first mention of it—as yet known—is in the

BIBLE.—"Stacte, and onycha, and galbanum, with pure frankincense" were the "sweet spices" of which the "pure and holy perfume," or "confection," of divine prescription was made "after the art of the apothecary," which was offered every morning and evening, on the "Altar of Incense" or "Golden Altar," set in the "Holy Place" between the "Golden Candlestick" and "the Table of Shewbread," before the "Holy of Holies"[1]. The priest took a censer, "full of burning coals of fire," from off "the Altar of Burnt Offering" or "Brazen Altar," and his "hands full of the sweet incense beaten small," and entered "the Holy Place" from "the Court of the Tabernacle," and emptied his censer upon the Golden Altar, and "put the incense upon the fire before the Lord, that the cloud of incense may cover the mercy-seat"[2]. It was death for the priests to make the sacred incense for themselves, even "to smell thereto"[3], or for any one but the priests, "the seed of Aaron," to offer it[4], or to burn "strange incense" upon the Golden Altar[5].

[1] Exod. xxx. 34–36. [2] Lev. xvi. 12, 13. [3] Exod. xxx. 37, 38.
[4] Numb. iii. 10; xvi.; 2 Chron. xxvi. 16–24.
[5] Exod. xxx. 9; Lev. x. 1–7; Numb. iii. 4, xxvi. 61.

Neither was it lawful to offer burnt sacrifice or meat-offering, or to pour drink-offering thereon[1]; but the blood of the sin-offering of atonements was once in every year sprinkled upon the horns thereof[2]. "Pure frankincense" was put on each of the two rows in which the twelve baked cakes of fine flour were set on the Table of Shewbread[3]; it was also put upon the meat-offering[4], and was expressly prohibited to be put upon the sin-offering of fine flour, "for it is a sin-offering"[5], or on "the offering of jealousy" of barley meal, "for it is an offering . . . bringing iniquity to remembrance"[6]. And in the service of the sanctuary, certain Levites were appointed to oversee "the frankincense and the spices"[7], which were laid in "a great chamber" "of the house of God"[8].

Frankincense is often named in the poetical books of the Old Testament:—"Who is this that cometh out of the wilderness, like pillars of smoke, perfumed with myrrh and frankincense, with all powders of the merchant?"[9]—an image which those only can fully appreciate who have themselves been

> "Where through the sand of morning land
> The camel bears the spice."

"A garden inclosed is my sister, my spouse; a spring shut up, a fountain sealed. Thy plants are an orchard of pomegranates, with pleasant fruits; camphire [henna], with spikenard, spikenard and saffron; calamus [*Roosa* of India] and cinnamon, with all trees of frankincense; myrrh and aloes [aloeswood], with all the chief spices. A fountain of gardens, a well of living waters, and streams from Lebanon"[10].

"I have not caused thee to serve with an offering, nor wearied thee with incense [frankincense]. Thou hast bought me no sweet cane [*Roosa*] with money"[11]. "The multitude of camels shall cover thee, the dromedaries of Midian and Ephah; all they from Sheba shall come; they shall bring gold and incense" [frankincense][12].

"He that offereth an oblation is as if he offered swine's blood; he that burneth incense [frankincense], as if he blessed an idol"[13].

"To what purpose cometh there to me incense [frankincense] from Sheba, and the sweet cane [*Roosa*] from a far country?"[14] "And they shall come from the cities . . . and from the plain, and from the mountains, and from the south [Arabia[15]], bringing

[1] Exod. xxx. 9.
[2] Exod. xxx. 10; Lev. iv. 7.
[3] Lev. xxiv. 7.
[4] Lev. ii. 1, 2, 15, 16; vi. 15.
[5] Lev. v. 11.
[6] Numb. v. 15.
[7] 1 Chron. ix. 29.
[8] Nehemiah, xiii. 5–9.
[9] Song of Songs, iii. 6.
[10] Song of Songs, iv. 12–15.
[11] Isaiah, xliii. 23, 24.
[12] Isaiah, lx. 6.

> "See a long race thy spacious courts adorn;
> See future sons and daughters yet unborn,
> In crowding ranks on every side arise,
> Demanding life, impatient for the skies!
> See barbarous nations at thy gates attend,
> Walk in thy light, and in thy temple bend!
> See thy bright altars throng'd with prostrate kings,
> And heap'd with products of Sabæan springs!
> For thee Idume's spicy forests blow,
> And seeds of gold in Ophir's mountains glow!"

[13] Isaiah, lxvi. 3.
[14] Jeremiah, vi. 20.
[15] Matt. xii. 42; compare Gen. xxv. 6, and Matt. ii. 1.

burnt-offerings, and sacrifices, and meat-offerings and incense [frankincense], and bringing sacrifices of praise, unto the house of the Lord"[1].

These passages emphatically derive frankincense from Sheba.

The Hebrew words for incense are quite different from the Hebrew word for frankincense (*Lebonah*); but in most of the passages where they are found, frankincense may be understood as necessarily a constituent of the sacred incense of the Jewish ritual. Kitto says that these words for incense (*miktar*, *kitter*, and *keturoth*) all signify to raise an odour by burning, and are applied not only to the offering of incense, but of sacrifices, and he points out that the word which denotes the incense of sweet spices in Exod. xxx. 1, describes an incense of fat in Psalm lxvi. 15: "I will offer unto thee burnt sacrifices of fatlings, with the incense of rams; I will offer bullocks with goats." But the word may be used here to give poetic expression to the passage, as the thing itself was to give a sweet savour to the burnt sacrifices. In 1 Chron. vi. 49, the word for incense is also used, according to Calmet, for the fat of victims offered on the altar of the burnt-offerings, but here, it may be supposed, without poetical licence. Gradually, as the spiritual discernment of the Jews developed, the offering of incense itself sublimed into prayer, as indicated in the figurative language of David, in Psalm cxli. 2, "Let my prayer be set forth before thee as incense, and the lifting up of my hands as the evening sacrifice." And the same figure is used in the magnificent imagery of the Apocalypse: "And the four-and-twenty elders . . . having every one of them harps, and golden vials full of odours, which are the prayers of the saints"[2]. "And another angel came and stood at the altar, having a golden censer; and there was given unto him much incense, that he should offer it with the prayers of all saints upon the golden altar which was before the throne. And the smoke of the incense, with the prayers of the saints, ascended up before God out of the angel's hand"[3].

The Jews buried their dead, the burning of the bodies of Saul and his sons[4] having been quite exceptional; but still they largely used unguents and spices, probably including frankincense, in their sepulchral rites. The dead body was anointed with spikenard[5], and "they wound it in linen clothes with the spices, as the manner of the Jews is to bury"[6]. And of the burial of Asa it is written, "And they buried him in his own sepulchre, which he had made for himself in the city of David, and laid him in the bed which was filled with sweet odours and divers kinds prepared by the apothecary's art: and they made a very great burning for him"[7].

The account in the Iliad, of the burning of the dead body of Patroclus, would, by substituting the presentation of cows to Brahmins for the sacrifice of horses at the pyre, and milk for wine to quench its embers, serve to describe the funeral rites of a wealthy high-caste Hindoo of Bombay, in which frankincense, with all manner of balsamic substances, and fragrant woods and oils, are largely used; and we know that in the burning of their dead and in their sacrifices the Greeks, like the Romans, used frankincense extravagantly; but yet frankincense is not anywhere named in the Iliad or Odyssey, and it

[1] Jeremiah, xvii. 26. [2] Rev. v. 8. [3] Rev. viii. 3, 4.
[4] 1 Sam. xxxi. 12, 13. [5] John, xii. 7. [6] John, xix. 39, 40.
[7] 2 Chron. xvi. 14; Pet. Cunæus de Respub. Hebræorum. Leyden, 1631.

is said that it was unknown to the Greeks at the time when they were written[1]. But from about B.C. 400 frankincense is commonly and unceasingly mentioned by classical writers.

HERODOTUS (born B.C. 484) mentions it frequently[2]; and what he says about it is of course particularly valuable. He says, "Arabia . . . is the only country which produces frankincense, myrrh, cassia, cinnamon, ladanum. The Arabians do not get any of these, except myrrh, without trouble. The frankincense they procure by means of the gum storax, which the Greeks obtain from the Phœnicians; this they burn and thereby obtain the spice. For the trees which bear the frankincense are guarded by winged serpents, small in size and of varied colours, whereof vast numbers hang about every tree. They are of the same kind as the serpents which invade Egypt, and there is nothing but the smoke of the styrax which will drive them from the trees"[3]. "As one proceeds beyond Heliopolis up the country, Egypt becomes narrow, the Arabian range of hills, which have a direction north to south, shutting it up on one side, and the Libyan range upon the other. The former ridge runs on without a break and stretches away to the sea called Erythræan: it contains the quarries whence the stone was cut for the pyramids of Memphis; and this is the point where it ceases its first direction, and bends away in the manner above indicated. In its greatest length from east to west it is, as I have been informed, a distance of two months' journey; towards its extreme east, its skirts produce frankincense"[4]. "The Arabs brought every year a thousand talents of frankincense, in tribute to Darius"[5]. "It is also on the great altar [of gold] that the Chaldæans burn the frankincense, which is offered to the amount of one thousand talents weight, every year at the festival of the god"[6] [Bel]. In describing "the mode of embalming amongst the Egyptians, according to the most perfect practice," he says "they fill the cavity [of the abdomen] with the purest bruised myrrh, with cassia, and every sort of spicery, *except frankincense*"[7]. And of the Scythians, "Their women make a mixture of cypress, cedar, and frankincense wood, which they pound into a paste upon a rough piece of stone, adding a little water to it. With this substance, which is of a thick consistency, they paste their faces all over, and indeed their whole bodies. A sweet odour is thereby imparted to them; and when they take off the plaster on the day following, their skin is clean and glossy"[8].

THEOPHRASTUS, who lived only a century later (B.C. 394–287), gives the fullest and most accurate account of frankincense of all ancient writers. I give a translation of what he says about it, in full, and especially as it has never before, I believe, been done into English (History of Plants, book ix. ch. 4)[9].

"Concerning frankincense and myrrh and balsam, and whatever else is like these, it

[1] Crusius, Homeric Lexicon, trans. Smith, ed. Arnold.

[2] Schweighæuser, Lexicon Herodoteum.

[3] Book iii. Thalia, 107, Rawlinson's translation.

[4] Book ii. Euterpe, 8, Rawlinson's trans.

[5] Book iii. Thalia, 97, Rawlinson's trans.

[6] Book i. Clio, 183, Rawlinson's trans.

[7] Book ii. Euterpe, 86, Rawlinson's trans.

[8] Book iv. Melpomene, 75, Rawlinson's trans.

[9] Θεόφραστος. Theophrasti Eresii opera, quæ supersunt omnia. Græca recensuit, Latine interpretatus est, indices rerum et verborum absolutissimos adjecit Fridericus Wimmer, Doct. Philos. Parisiis, Didot, 1866, 8vo, pp. 143–145.

has [already] been said, that they are produced by incision, and spontaneously. And we must [now] endeavour to tell what is the nature of the trees, and if they have any thing peculiar as to their origin or collection, or other matters; and, in like manner, concerning the other sweet-smelling trees; for almost the whole of them grow in places towards the south and east. The frankincense-tree and myrrh and cassia and cinnamon grow in the Chersonese of the Arabians, about Saba and Adramyta, and Citibæna and Mali. But the trees of frankincense and myrrh grow, some of them on the mountain, and others in private plantations, at the foot of the mountain; on which account, some of them are cultivated, and others are not: and they say that the mountain is lofty and thickly wooded, and covered with snow, and that rivers also flow down from it into the plains, and that the frankincense-tree is not large, being five cubits high, and covered with boughs, and that it has a leaf like that of the pear-tree, only much smaller, and is of a grassy colour, very like rue, and has altogether a smooth bark like the laurel; but that the myrrh-tree is still smaller in size and more shrub-like, and that it has a hard trunk, and is twisted towards the ground, and is thicker than a man's leg, and has a smooth bark, like purslane. But others, who say they have seen them, nearly all agree concerning their size, namely, that neither of the trees is large, the myrrh-tree being the smaller and lower [of the two]. And they state that the frankincense bears a resemblance to a laurel, and that it has a smooth bark, but that the myrrh is prickly and not smooth, and that it has a leaf like the elm, only crisp, and prickly at the top, like the ilex-tree. And these said that in a voyage which they were making from the Bay of Heroes, they disembarked to search for water on the mountain, and thus saw the trees and the mode of collecting [the frankincense]. And that the trunks and boughs of both were incised; but that the former appeared to have been cut, as it were, by an axe, and the latter to have had more gentle incisions; and that the drops partly fell down and partly remained on the tree. And that in some places mats woven of palm-leaves were placed underneath, while in others the ground underneath was hardened and kept clean; and that the frankincense on the mats was pure and transparent, but that on the ground less so; and that they scraped off what adhered to the trees with knives, so that the bark stuck to some of them. And they said that the whole mountain was divided among the Sabæans; for that they were the lords [of the place], and that they were just towards one another, on which account no one kept any guard [over his own property]; and that having themselves taken thence an abundance of frankincense and myrrh, which they placed in their ships, none of the inhabitants being present, they had sailed away. And these both told this, and said they heard that the myrrh and frankincense is gathered together on every side to the temple of the Sun; and that this belongs to the Sabæans, being by far the most sacred thing in the country, and that certain armed Arabs have the custody of it; and that when they bring it, each, heaping up his own frankincense, and the myrrh in a similar way, leaves them with the keepers, and places upon the heap a little tablet, stating the number of the measures, and the price at which each measure is to be sold; and that when the merchants come they inspect these tablets, and having measured any heap that pleases them, they put the price of it in the place from which it is taken; and that the priest then coming takes a third part of the price for the god, and there

leaves the remainder, which is kept safe for the owners until they come and take it. But certain others say that the frankincense-tree is like the lentisck, and its fruit to the berries of the same, and that the leaf of it is reddish; and that the frankincense from the young trees is whiter and less fragrant, while that from the older trees is yellowish and more fragrant; and that the myrrh-tree is like the terebinth, but rougher and more thorny, and the leaf a little rounder and, if chewed, resembling the terebinth in taste; and that of these, also, the older are the more fragrant. And that both grow in the same place, and that the ground [there] is argillaceous and flaky, and that springs of water are rare. These things, however, are contradictory [to the statement] that it snows and is wet [in that locality], and that rivers issue from it. And others also say that the tree is like the terebinth, and others that it is the terebinth itself; for that specimens of the wood were brought to Antigonus by the Arabs who conveyed the frankincense, and that they differed in nothing from the terebinth. These, however, showed still greater ignorance; for they thought that both the frankincense and the myrrh grew on the same tree. On which account, the report brought by those that sailed from the City of Heroes is more credible; since the frankincense-tree that grew above Sardis, in a certain temple, has a leaf like the laurel, if from this we may form a conclusion, and the frankincense produced from it, whether from the trunk or branches, is like the other frankincense in appearance, and in smell when it is burnt. And this tree alone grew without [any culture]. And some say that the frankincense grows more abundantly in Arabia, but more beautiful in the neighbouring islands, over which the Arabs have sway; for there they make figures upon the trees of whatever they like; which is not incredible, as they admit of any incision that persons may wish to make in them. Some of the grains also are very large, in bulk as much as a handful, and in weight more than the third part of a mina. All frankincense is brought to market in a rough state, similar in appearance to the bark of a tree; but of myrrh there are two kinds, the one in drops, and the other in moulds. The quality is judged of by the taste; and from this they choose what is of uniform colour. Concerning frankincense and myrrh, this is nearly as much as we have heard up to the present time."

A fragment of AGATHARCIDES (B.C. 200) is said, for I have not seen the passage myself, to enumerate balm, cassia, frankincense, myrrh, and cinnamon as the productions of Saba.

DIODORUS (about B.C. 50) writes[1]:—"Next to these inhabit those Arabians called Carbi, and next to them the Sabæans, the most populous of any of the Arabians; for they possess Arabia the Happy, exceeding rich in all those things which we esteem most precious; and for breeding of cattle of all sorts, the most fertile country in the world; for the whole country is naturally perfumed all over, almost every thing growing there sending forth continually most excellent odours. On the sea-coasts grow balsam, cassia, and another herb of a strange and peculiar property, which while it is fresh is delightful and strengthening to the eyes, but kept awhile, presently loses its virtue. Higher in the heart of the country, are shady woods and forests, graced and beautified with stately

[1] Book v. Chap. iii. Booth's Translation, Lond. 1814, vol. i. pp. 186–189.

trees of frankincense and myrrh, palm-trees, calamus, and cinnamon, and such like odoriferous plants; for none can enumerate the several natures and properties of so great a multitude, or the excellency of those sweet odours that breathe out of every one of them. For their fragrancy is such, that it even ravishes the senses with delight, as a thing divine and unutterable; it entertains them that sail along by the coast at a great distance with its pleasures and delights. For in spring-time the winds from off the land waft the air, perfumed with the sweet odours of myrrh and other odoriferous plants, to those parts of the sea that are next to them. And these spices have nothing of a faint and languishing smell, as those that come to our hands, but a strong and vigorous odour, that strongly pierces all their senses to the utmost of their capacity; for the wafts of air dispersing the perfumes of these odoriferous plants, abundance of pleasant, healthful, and strange variety of scents (proceeding from the richest spices) are conveyed to them that sail near unto the coast. For this sweet smell comes not from fruit bruised in a mortar (whose strength is in a great measure decayed) or from spices made up in divers sorts of vessels for transportation; but from the ripeness of the fruit as it grows, and from the pure and divine nature of the plant itself. So that they that have the advantage of these sweet odours, seem as if they were entertained with that feigned meat of the gods called ambrosia, since those excellent perfumes cannot have a name ascribed them transcending their worth and dignity.

"Yet fortune has not imparted to men an entire and unmixed felicity in these things; but has joined some inconveniencies with these advantages, to correct them who (through a constant confluence of earthly blessings) have usually despised and slighted the gods. For these fragrant forests abound with red serpents of a span long, whose bite is deadly and incurable. They strike a man with a violent assault, leaping up in his very face, leaving him besmeared with his own blood.

"The capital city of this nation is called Saba, and stands upon a high hill; they are governed by kings, who inherit the crown by descent; yet the honour allowed them by their subjects is such, as that they are in some respects, notwithstanding, in a sort of bondage and slavery; for though they seem to be privileged in this, that they have a sovereign and absolute power in making laws, and are not to give an account of any of their actions to their subjects; yet they are as unhappy in this, that they are never to stir out of their palace; for if they do, the people stone them to death, for so they are commanded by an ancient oracle.

"This nation not only excels all the neighbouring barbarians in wealth, but all other people whatsoever for plenty of every thing that is accounted precious; for in their traffic, for a thing of a very small weight, they receive a greater sum of money than any other merchants that sell goods for silver.

"Being, therefore, that they never were conquered, by reason of the largeness of their country, they flow, as it were, in streams of gold and silver, especially at Saba, the seat-royal of their kings; their vessels and all their cups are of gold and silver, and likewise their beds, chairs, and stools have their feet of silver; and all other their household stuff is so sumptuous and magnificent, that it is incredible. The porticoes of their houses and temples are some of them overlaid with gold; and silver statues are placed upon

some of the chapiters of the temples. The doors and roofs of their inner rooms are adorned with many golden bowls, set with precious stones, and other things of great value; for they have enjoyed a constant and uninterrupted peace for many ages and generations, being very far remote from those whose covetousness prompts them to advance their gain by the riches of others.

"The sea there is of a very white colour, so that a man may as justly wonder at the strangeness of the thing, as be inquisitive what should be the cause.

"Near hereunto are the Fortunate Islands, full of walled towns, where all the sheep and cattle are exceeding white, and none of the females bear any horns. The merchants from all parts resort to these islands, especially from Pontaña, built by Alexander the Great, upon the banks of the river Indus, that there might be a commodious port-town for shipping upon these coasts; but of this country and its inhabitants, we have said enough."

And[1]:—"Having gone through the western and northern countries and the islands of the ocean, we shall now describe the southern islands, lying in the Arabian ocean, on the east part of Arabia, next to Gedrosia. This part of Arabia is a country full of villages and considerable towns, some of which are situated upon high hills, others upon rising grounds, or something higher than champaign fields. Their greatest cities have stately royal palaces, and are very wealthy and populous; the country abounds with all sorts of cattle, and is of a very fruitful soil, affording plenty of rich pastures for the flocks and herds; many rivers run through it, watering the fields, to the great increase of the fruits of the earth. And, therefore, this part of Arabia, which excels the rest in richness of soil, is justly called Arabia the Happy.

"Over against the utmost point of this country, near the ocean, lie many islands; but there are but three that are worth remark: the first is called the Holy Island, wherein it is unlawful to bury the dead; but not far from this, about seven furlongs distant, there is another, wherein they bury. The sacred isle produces frankincense, and in that abundance as suffices for the service and worship of the gods all the world over; it has likewise plenty of myrrh, with other odoriferous spices of several sorts, which breathe out a most fragrant smell. The nature of frankincense, and the manner of getting it, is thus: the tree is very small, like to the white Egyptian thorn, and bears a leaf like to the willow; it puts forth a flower of a golden colour; from the bark of this tree, by incision made, distils the frankincense in drops, like tears.

"The myrrh-tree is like to the mastic-tree, but bears a more slender leaf, and grows thicker on the branches. The myrrh flows forth by digging up the earth round about the roots. Those that grow in a rich soil, bear twice a year—that is, in the spring and summer: that in the spring-time is of a deep red colour, caused by the dew; the other, nearer winter, is white.

"There they got likewise the fruit of the paliurus tree, wholesome both in meat and drink, and good against a dysentery. The land is divided amongst the inhabitants, of which the best part is allotted to the king, who has likewise the tenths of the fruits.

[1] Book v. chap. iii. Booth's Translation, Lond. 1814, vol. i. pp. 324–329.

"They say the breadth of this island is about two hundred furlongs, inhabited by them they call Panchæans, who transport the myrrh and frankincense into foreign parts, and sell it to the Arabian merchants, from whom others buy these and such like merchandise, and convey them to Phœnicia, Cœlesyria, and Egypt; and from those places they are carried by the merchants over all parts of the world.

"Besides these, there is another large island, about thirty furlongs distance from this last mentioned, lying to the east, many furlongs in length. For they say, from a promontory thereof running out towards the east, may be seen India, like a cloud in the air, the distance is so great.

"There are many things observable in Panchæa that deserve to be taken notice of. The natural inhabitants are those they call Panchæi; the strangers that dwell among them are people of the western parts, together with Indians, Cretans, and Scythians.

"In this island there is a famous city, called Panara, not inferior to any for wealth and grandeur. The citizens are called the suppliants of Jupiter Triphylius, and are the only people of Panchæa that are governed by a democracy without a monarch. They choose every year the presidents or governors, that have all matters under their cognizance; but what concerns life and death, and the most weighty matters, they refer to the college of their priests. The temple of Jupiter Triphylius is about sixty furlongs distant from the city, in a champaign plain. It is in great veneration, because of its antiquity and the stateliness of the structure, and the fertility of the soil.

"The fields round about the temple are planted with all sorts of trees, not only for fruit, but for pleasure and delight; for they abound with tall cypresses, plane trees, laurels, and myrtles, the place abounding with fountains of running water; for near the temple there is such a mighty spring of sweet water rushes out of the earth, as that it becomes a navigable river; thence it divides itself into several currents and streams, and waters all the fields thereabouts, and produces thick groves of tall and shady trees; amongst which, in summer, abundance of people spend their time, and a multitude of all sorts of birds build their nests, which create great delight both by affecting the eye with the variety of their colours, and taking the ear with the sweetness of their notes. Here are many gardens, sweet and pleasant meadows, decked with all sorts of herbs and flowers, and so glorious in the prospect, that it seems to be a paradise worthy of the gods themselves.

"There are here likewise large and fruitful palms, and abundance of walnut-trees, which plentifully furnish the inhabitants with pleasant nuts. Besides all these, there are a multitude of vines of all sorts, spiring up on high, and so curiously interwoven one amongst another, that they are exceeding pleasant to the view, and greatly advance the delights of the place.

"The temple was built of white marble, most artificially jointed and cemented, two hundred yards in length, and as many in breadth, supported by great and thick pillars, curiously adorned with carved work. In this temple are placed huge statues of the gods, of admirable workmanship, and amazing largeness. Round the temple are built apartments for the priests that attend the service of the gods, by whom every thing in that sacred place is performed. All along from the temple is an even course of ground, four

furlongs in length, and a hundred yards in breadth; on either side of which are erected vast brazen statues, with four square pedestals; at the end of the course breaks forth the river, from the fountains before mentioned, from whence flows most clear and sweet water, the drinking of which conduces much to the health of the body. This river is called the water of the sun.

"The whole fountain is lined on both sides, and flagged at the bottom with stone, at a vast expense, and runs out on both sides for the space of four furlongs. It is not lawful for any body but the priests to approach to the brink of the fountain. All the land about, for two hundred furlongs round, is consecrated to the gods, and the revenues bestowed in maintaining the public sacrifices and service of the gods; beyond these consecrated lands is a high mountain, dedicated likewise to the gods, which they call the throne of Cœlus and Triphylius Olympus; for they report that Uranus, when he governed the whole world, pleasantly diverted himself in this place, and from the top of the mount observed the motions of the heavens and stars, and that he was called Triphylius Olympus, because the inhabitants were composed of three several nations, Panchæans, Oceanites, and Doians, who were afterwards expelled by Ammon; for it is said that he not only rooted out this nation, but utterly destroyed all their cities, and laid Doia and Asterusia even with the ground. The priests every year solemnize a sacred festival in this mountain, with great devotion.

"Behind this mount, in other parts of Panchæa, they say there are abundance of wild beasts of all kinds, as elephants, lions, leopards, deer, and many other wonderful creatures, both for strength and proportion. In this island there are three chief cities, Hyracia, Dalis, and Oceanis. The whole country is very fertile, and especially in the production of all sorts of wine in great plenty.

"The men are warlike, and use chariots in battle, after the ancient manner. The whole nation is divided into three parts: the first class is of the priests, with whom are joined the artificers; the other tribe consists of the husbandmen; and the third are the militia and the shepherds.

"The priests govern all, and are the sole arbitrators in every matter; for they give judgment in all controversies, and have the power and authority in all public transactions of state. The husbandmen till the land; but the fruit is brought into the common treasury; and who is judged the most skilful in husbandry, receives the largest share of the fruits for a reward in the first place; and so the second, and the rest in order to the tenth, as every one merits, less or more, receives his reward by the judgment of the priests. In the same manner the shepherds and herdsmen carefully bring into the public stock the victims and other things, both by number and weight, as the nature of things are; for it is not lawful for any to appropriate any thing to themselves particularly, except a house and garden. For all the young breed of cattle and other things, and all the revenues, are received by the priests, and they justly distribute to every one as their necessity does require; only the priests have a double proportion.

"They wear soft and fine garments; for the sheep's wool is much finer here than anywhere else. Both men and women likewise deck themselves with golden ornaments; for they wear necklaces of gold, and bracelets about their arms, and, like the

Persians, have ear-rings hanging in their ears. Their shoes are such as others wear, but richly beautified with divers sorts of colours.

"Their soldiers, for ordinary pay, defend the country, fortifying themselves within camps and bulwarks; for there is a part of the island infested with most daring thieves and robbers, who often lurch and surprise the husbandmen.

"To conclude, these priests, for delicacy, state, and purity of life, far excel all the rest of the inhabitants; their robes are of white linen, and sometimes of pure soft wool. They wear likewise mitres, embroidered with gold. Their shoes are sandals curiously wrought with exquisite workmanship; and in their ears hang golden ear-rings like to the women's.

"They attend chiefly upon the service of the gods, singing melodious songs in their praises, setting forth their glorious acts and benefits bestowed upon men. The priests say they came originally from Crete, and were brought over into Panchæa by Jupiter when he was upon earth and governed all the world; and allege their language for a confirmation of this assertion, inasmuch as they retain many words of the Cretan speech among them: and further say that they derive from their ancestors that civility and kindness wherewith they entertain the Cretans, the fame and report of their ancient consanguinity descending continually in a perpetual succession to their posterity; they show likewise a record written, as they say, by Jupiter's own hand, at the time when he was on earth and laid the foundation of the temple.

"There are in this island likewise mines of gold, silver, brass, and iron; but it is not lawful for any to export them. Nay, it is not lawful for any of the priests to go out of the verge of the consecrated ground; and if any do, it is lawful for any man that finds them to kill them. They have under their charge innumerable vast vessels, and other consecrated things, both of gold and silver, which have been laid up there in honour of the gods for many ages. The gates of the temple are of admirable workmanship, beautified with gold, silver, ivory, and thyine wood

"The bed of the god is six cubits long, and four broad, of massy gold, most curiously wrought in every part; near adjoining, stands the table, as large, and of the like materials and workmanship with the other in every respect.

"In the middle of the bed is placed a great golden pillar, whereon are letters inscribed, called by the Egyptians sacred writing, expressing the famous actions of Uranus, Jupiter, Diana, and Apollo, written, they say, by Mercury himself. But this may suffice concerning the islands lying in the ocean over against Arabia."

STRABO (B.C. 54—A.D. 24) says[1], "Frankincense is produced in Catabania and in the parts of Africa opposite. Here the frankincense-tree grows along the banks of the Isis and Nilus. The country of the Sabæi produces not only frankincense, but balsam, sweet-smelling palms, calamus, and larimnum, a most fragrant perfume. By the trade in these aromatics both the Sabæans and the Gerrhæi have become the richest of all the tribes, and possess a great quantity of wrought articles in gold and silver, as couches, tripods, basins, drinking-vessels; to which we must add the costly magnificence of their houses; for the doors, walls, and roofs are variegated with inlaid

[1] Book xvi. chap. iv. Falconer and Hamilton's Translation, Bohn's Classical Lib.

ivory, gold, silver, and precious stones." The expedition sent by Augustus, under the command of Ælius Gallus, against the Arabians (B.C. 24—A.D. 1) (at the same time that Petronius was sent into Æthiopia, and reduced Candace, queen of Meroe), was to explore the nature of these places and their inhabitants. It was very unfortunate. The expedition was fitted out as if for a great war; but the cities yielded one after another without a struggle, and, although the army suffered exceedingly from long marches over bad roads, and from want of food, and boils, only seven men fell in the expedition, which "contributed little in extending our knowledge of the country." "The aromatic country is divided into four parts. Of aromatics, the frankincense and myrrh are said to be the produce of trees, but cassia of bushes. Yet some writers say that the greater part of it [the cassia] is brought from India, and that the best frankincense is that of Persia." "The Nabatæans worship the sun, and construct the altar on the top of the house, pouring out libations, and burning frankincense on it every day."

PLINY (A.D. 23–79) says[1], "There is no region in the whole world that bringeth forth frankincense but Arabia; and yet it is not to be found in all parts thereof, but in that quarter only of the Atramites. Now these Atramites inhabit the very heart of Arabia, and are a country of the Sabæi. The capitall city of the whole kingdom is called Sabota, seated upon a high mountain; from whence into Saba, the only country that yields such plenty of the said incense, it is about eight daies journey. As for Saba (which in the Greek tongue signifieth, a secret mysterie) it regards the Sunne rising in summer, or the north-east, enclosed on every side with rocks inaccessible; and on the right hand it is defended with high cliffes and crags that beare into the sea. The soile of this territorie, by report, is reddish, and inclining to white. The forrests that carry these incense-trees ly in length twenty schœnes, and beare in bredth half as much. Now that which we cal schœnus, according to the calculation of Eratosthenes, contains forty stadia, that is to say, five miles; howsoever some have allowed but thirty-two stadia to every schœnus. The quarter wherein these trees grow is full of high hills; howbeit, go down into the plains and valley beneath, you shall have plenty of the same trees, which come up of their own accord, and were never planted. The earth is fat, and standeth much upon a strong clay, as all writers do agree. Few springs are there to be found, and those that be are full of nitre. There is another tract by it selfe confronting this country, wherein the Minæans do inhabit; and through them there is a narrow passage, whereby the frankincense is transported into other parts. These were their first neighbours that did traffique with them for their incense, and found a vent for it; and even so they doe still at this day, whereupon the frankincense itselfe is called of their name, Minæum. Setting these people of the Sabeans aside, there be no Arabians that see an incense tree from one end of the yere to another; neither are all these permitted to have a sight of those trees. For the common voice is, that there be not above 3000 families which can claime and challenge by right of succession that priviledge to gather incense. And therefore all the race of them is called sacred and holy; for looke when they go about, either cutting and flitting the trees, or gathering the incense, they must not that day come neere a woman to know her carnally; nay, they must not be at any funerals, nor

[1] Book xii. chap. 14. Holland's Translation, Lond. 1635, fol.

approach a dead corps, for being polluted. By which religion and ceremonious observation the price is raised and the incense is the dearer. Some say, these people have equall liberty in common to go into these woods for their commodities when they will; but others affirme that they be divided into companies, and take their turns by yeares. As concerning the very tree, I could never know yet the perfect description of it. We have waged warres in Arabia, and our Roman armie have entered a great way into that country. C. Cæsar, the adopted son of Augustus, wan great honour and glory from thence; and yet verily, to my knowledge, there was never any Latine author that hath put down in writing the form and fashion of the tree that carrieth incense. As for the Greeke writers, their bookes doe vary and differ in that point. Some give out, that it hath leaves like to a peare tree, only they be somewhat lesse, and when they come forth they be of a grasse green colour. Others say that they resemble the lentiske tree, and are somewhat reddish. There be again who write, that it is the very terebints and none else, that giveth the frankincense: of which opinion king Antigonus was, who had one of these shrubs brought unto him. King Juba in those books which he wrot and sent to C. Cæsar, son to the Emperor Augustus (who was inflamed with an ardent desire to make a voiage into Arabia, for the great fame that went thereof), saith, That the tree which beares frankincense hath a trunke or body writhen about, and putteth forth boughes and branches, like for all the world to the maple of Pontus. Item, that it yeeldeth a juice or liquor as doth the almond tree; and such are seene commonly in Carmania; as also those in Egypt, which were planted by the careful industrie of the Ptolomees, kings there. However it be, this is received for certaine, that it hath the very barke of a bay tree; some also have said that the leaves be as like. And verily such kind of trees were they which were seen at Sardis; for the kings of Asia likewise were at the cost and labour to transplant them, and desirous to have them grow in Lydia. The embassadours who, in my time, came out of Arabia to Rome, have made all that was delivered as touching these trees, more doubtfull and uncertaine than before. A strange matter, and wonderfull indeed, considering that twigges and branches of the incense tree have passed betweene; by the view of which impes, we may judge what the mother is: namely, even and round in the body, without knot or knar, and from thence she putteth out shoots.

"They used in old time to gather the incense but once a yere, as having little vent, and small returne, and lesse occasion to sell than now adaies; but now, since every man calleth for it, they feeling the sweetnesse of the gaine, make a double vintage (as it were) of it in one yere. The first, and indeed the kindly season, falls about the hottest daies of the summer, at what time as the Dog daies begin; for then they cut the tree where they see the bark to be fullest of liquor, and whereas they perceive it to be thinnest and strut out most. They make a gash or slit only to give more libertie; but nothing do they pare or cut cleane away. The wound or incision is no sooner made, but out there gusheth a fat fome or froth: this soon congeales and growes to be hard; and where the place will give them leave, they receive it in a quilt or mat, made of date-tree twigs, plaited and wound one within another wicker-wise. For elsewhere, the floore all about is paved smooth, and rammed downe hard. The former way is the better to gather the purer and clearer

frankincense; but that which falleth upon the bare ground prooves the weightier. That which remaines behind, and stickes to the tree, is parted and scraped off with knives, or such like yron tooles, and therefore no marvell if it be full of the shavings of the bark. The whole wood or forrest is divided into certaine portions; and every man knowes his owne part: nay, there is not one of them that will offer wrong unto another, and encroch upon his neighbors. They need not to set any keepers to look unto those trees that be cut, for no man will rob from his fellow if he might, so just and true they be in Arabia. But, believe me, at Alexandria, where frankincense is tried, refined, and made for sale, men cannot look surely ynough to their shops and work-houses, but they will be robbed. The workeman that is emploied about it, is all naked, save that he hath a paire of trouses or breeches to cover his shame, and those are sowed up and sealed too, for fear of thrusting any into them. Hood-winked he is sure enough for seeing the way to and fro, and hath a thicke coife or maske about his head, for doubt that he should bestow any in mouth or eares. And when these workmen be let forth againe, they be stripped starke náked, as ever they were borne, and sent away. Whereby we may see, that the rigor of justice cannot strike so great feare into our theeves here, and make us so secure to keepe our owne, as among the Sabæans the bare reverence and religion of those woods. But to returne again to our former cuts. That incense which was let out in summer, they leave there under the tree until the autumne, and then they come and gather it. And this is most pure, cleane and white.

"A second vintage and gathering there is in the spring: against which time they cut the barks before in the winter, and suffer it to run out until the spring. This comes forth red, and is nothing comparable to the former. The better is called Carpheotum; the worse, Dathiatum. Moreover, some say, that the gum which issueth out of the young trees is the whiter; but that which comes from the old, is more odoriferous. There be others also of opinion, that the better incense is in the islands. But King Juba doth avouch constantly, that there is none at all in the islands. That which is round, like unto a drop, and so hangeth, we call the male incense, whereas in other things lightly we name the male, but where there is a female. But folk have a religious ceremonie in it, not to use so much as the tearme of the other sexe in giving denomination to frankincense. Howbeit, some say that it was called the male for a resemblance that it hath to cullions or stones. In very truth, that is held for the cheife and best simply, which is fashioned like to the nipples or teats that give milk, standing thick one by another: to wit, when the former drop that distilled, hath another presently followeth after, and so consequently more unto them, and they all seem to hang together like bigs. I read, that every one of these were wont to make a good handfull, namely, when men were not so hasty and eager to carry it away, but would give it time and leisure to drop softly. When it is gathered in this sort, the Greeks use to call it Stagonias and Atomus; but the lesser goblets they name Orobias. As for the small crums or fragments which fall off by shaking, we called manna (i. e. Thuris). And yet there be found at this day drops of incense that weigh the third part of a pound, that is to say, about thirty-nine Roman deniers[1]. It happened on a time, that King Alexander the Great being then but

[1] Or rather thirty-three and a scruple.

a very little child, made no spare of incense, but cast still upon the altar without all measure when he offered sacrifice. Whereupon Leonides, his tutor and schoolemaister, by way of a light reproofe, said unto him thus, Sir, you should in that maner burne incense, when you have once conquered those nations where there growes incense. Which rebuke and checke of his tooke so deep a print in Alexander's heart, and so well he carried it in memorie, that after he had indeed made conquest of Arabia, he sent unto the said Leonides, his tutor, a ship ful fraught and charged with incense; willing him not to spare, but liberally to bestow upon the gods when hee sacrificed. To returne againe to our historie. When the incense is gathered (as is beforesaid) conveighed it is to Sabota, upon cammels' backs, and at one gate (set open for that purpose) is it brought into the citie. For by law forbidden it is on pain of death to take any other way. Which done, the priests there of the god whom they call Sabis, take the disme or tenth part of the incense, by measure, and not by weight, and set it apart for that god. Neither is it lawful for any man to buy or sell, before that duty be paied: which serves afterwards to support certaine publick expenses of the citie. For all strangers and travellers within the compasse of certain daies journey, if they come to the citie are courteously received, and liberally entertained at the cost and charge of the said god Sabis. Carried forth of the country it cannot be, but through the Gebanites; and therefore there is a custome paid to their king. The head citie of that kingdom, Thomna, is from Gaza (the next port-towne in Judæa toward our coast) seven-and-twentie miles fourscore times told: and this way is divided into sixty-two daies journey by camels. Moreover, besides tyth aforesaid, there be measures, bestowed upon the priests to their owne use and others likewise to the king's secretaries and scribes; and not only these have a share, but also the keepers, sextons, and wardens of the temple, the squires of the bodie, the guard and pensioners, the king's officers, the porters, groomes, and other servitors, pill and poll, and every one hath a snatch. Moreover, all the way as they travell; in one place they pay for their water, in another for fodder and provender, or else for their lodging and stable-room, and every where for one thing or other they pay toll: so as the charge for every cammell from thence to the sea, upon our coast commeth to 688 deniers; and yet we are not come to an end of paiements; for our publicanes and customers also belonging to our empire must have a fleece for their parts. And therefore a pound of the best incense will cost sixteen deniers, of the second fifteen, and the third fourteen. With us it is mingled and sophisticated with parcels of a white kind of rosin, which is very like to it; but the fraud is soon found by the meanes above specified. The best incense is tried and knowne by these markes, viz. If it be white, large, brittle, and easie to take a flame when it comes neare a coale of fire; last of all, if it will not abide the dent of the tooth, but flie in pieces and crumble, sooner than suffer the teeth to enter into it."

Pliny also says that the Sabæans cooked their food with the wood of the frankincense-tree[1]; and that, "in the Trojan times, there were no ointments, neither was supplication made with frankincense"[2].

Arrian (about A.D. 90) writes[3], "Beyond Kane [Makalla] the bay called Sakhalites

[1] Book xii. ch. 17, Celsius.

[2] Book xiii. ch. 1, Celsius.

[3] Vincent's Translation of the *Periplus and Voyage of Nearchus*, Oxford, 1809.

[Makalla Bay.—G. B.] commences: it is of vast extent and of considerable depth, and forms the coast of the frankincense country, a mountainous and impracticable tract, incommoded with fogs and a dark atmosphere in all the parts where the trees grow that produce the frankincense. The trees are neither large nor lofty; but the substance exudes from the bark, and becomes consistent, like the gum that weeps from several of our trees in Egypt. The incense is collected by the king's slaves, condemned to the service as a punishment; for the county is unhealthy in the extreme, pestilential even to those who navigate on the coast, and certain death to the wretched sufferers employed in the collection, who, if they escape death from the climate, are sure to perish by want and neglect. The coast which forms the border of this country terminates at the promontory called Suagros [Ras Fartak], the largest cape in the world, and projecting towards the east. There is a garrison here for the protection of the country, and a harbour, on which are the storehouses for the frankincense collected here from the whole coast." . . . "From Suagros the adjoining bay of Omana [Bay of Al Kammar?—G. B.] takes a large sweep of considerable depth into the main, six hundred stadia in extent, and towards the termination of this, the shore is high, rocky and steep too, for five hundred stadia more. At this boundary is the established port for the reception of the Sakhalitic incense, called Moskha [Morbat or Merbat?—G.B.]; it is a place regularly frequented by the vessels from Kane [Makalla], whilst the fleets returning from Barugaza [Broach] and Limurike [Canara and Malabar], if they happen to lose the season, are obliged to lie here and exchange part of their cargo, such as wheat, oil (of sesamum), or cottons, for frankincense, which is supplied by the king's agents and factors. Throughout the whole tract, called Sakhalites, frankincense lies piled up in heaps, without watch or guard to secure it, as if it were committed to some divine power for protection. For without the king's permission it is impossible to convey it on ship-board, either openly or clandestinely; even if a single grain were embarked it would be a marvellous chance if the vessel escaped seizure. From Moskha [Morbat or Merbat?] the coast extends fifteen hundred stadia more to the district of Asikho [Hafek of El Edresi]; and at the termination of this tract lie the seven islands of Zenobius [Curia Muria] in succession."

Again, of the country opposite, between Mount Elephant [Ras Fiel] and Aromata [Gardafui], he writes, "In these parts, the best and greatest quantity of frankincense is procured"[1].

Arrian mentions ἀρώματα amongst the exports of Abaletes, and that the myrrh of the African coast was taken to the opposite coast of Arabia; and names frankincense amongst the exports of Malao (Zeyla?), Moundus, Mosullon, or Mossylon (Berbera), and of the ports of Barbaria. The frankincense of these latter ports he calls "Peratick," or "*foreign.*" "But," observes Vincent[2], "it cannot be admitted in that sense, as to the commodity itself, for it is noticed expressly as a native produce of the place. Still it will lead us to solve a difficulty already noticed in regard to these ports of Barbaria called *Ta pera*, which, by a slight correction of the text will signify the ports beyond the straits (Bab-el-Mandeb). The articles obtained here would naturally be styled *Peratick*

[1] Vincent's Translation of the *Periplus and Voyage of Nearchus*, Oxford, 1809.

[2] Vincent's 'Commerce and Navigation of the Ancients in the Indian Ocean,' Lond. 1807, vol. i. p. 140.

(from Pera, *beyond*), and would be known by this title in the invoices, and the market of Alexandria, in contradistinction to those obtained within the Straits of Bab-el-Mandeb. The author is writing to Alexandrians, and is consequently specifying the precise parts where those commodities were obtained which they knew by the name of Peratick." Arrian names frankincense also as an export of Tobai, near Aromata, and of Kane (Makalla) in Arabia. He names it also as an import of Barbarike, at the mouth of the Indus, amongst the exports of which he names costus, bdellium, spikenard, indigo, all exports of Kurrachee at the present day. We have already seen that he names frankincense as exported to Barygaza (Broach) and Limurike from Moskha (Merbat). But when speaking of the exports of Ozene (Ougein in Central India, where the *Boswellia thurifera* of Colebrooke abounds) to Barygaza (Broach)—onyx stones, murrhine vases, and cotton, &c.—he does not specify frankincense. Ozene transmitted also spikenard, costus, and bdellium from Upper India to Barygaza; and amongst the imports of Barygaza are named also lycium, storax, melilotus, myrrh, and other aromata and unguents.

Ptolemy[1] (about A.D. 150) places the Libanotophoros, or thuriferous region, between Makalla and Muscat, placing the Smyrnophoros to its west, behind Makalla.

Dioscorides[2], who merely describes drugs, says that frankincense is produced in that part of Arabia called Libanotophoros, and that the best is called "Stagonias," that the Indian kind is darker, and mentions other varieties, "Syagrian" &c.

The casual notices of frankincense by the Latin poets and historians are also very valuable in the present argument. It would be impossible to quote in this paper all the passages in which frankincense is named or its use implied by them; for they would simply double its bulk. The most pertinent of them are quoted by Stuckius in his 'Sacrorum Sacrificiorumque Gentilium Descriptio,' and in the 'Hierobotanicon' of Celsius, from which two writers most of the information given in modern "Cabinets," "Treasuries," and "Cyclopædias" concerning frankincense is taken without acknowledgment, and very often without intelligence; and as Celsius makes a determined effort to exhaust all the learning on the subject, he very well proves how impossible it is to be universally learned on even so infinitesimal a subject as frankincense. In the case of some of the Latin poets (Ovid, Horace, Virgil, Martial, and Statius) the word for frankincense is always catching the eye on the look out for it. It occurs frequently in Tibullus, Claudian[3], and Apuleius; once or twice in Plautus, Juvenal, and Lucretius; once in Persius; and nowhere, so far as I have searched, in Terence. The single quotation each from Ausonius[4] and Florus[5], which name the Lebanon as the habitat of the frankincense-tree, are quite hackneyed. It is continually occurring in Aurelius Prudentius Clemens[6], whom I have never found quoted on the subject. This mass of quotations is direct evidence of the universal use of frankincense throughout the ancient world in the worship of the Gods.

These passages, all taken together, prove the universal trade of the nations of antiquity

[1] Geographia Ptolemæi: Basiliæ, 1542. Orbis Antiqui tab. geograph. secundum Ptolemæum: Amstelodami, 1730.

[2] Διοσκορίδης. Interprete Marcello Vergilio: Coloniæ, 1529. Et Ex Nova interpretatione, J. A. Sarraceni Lugdunæi, 1598. [3] Miracula Christi. [4] Monosyll. 346. 5. [5] Lib. iii. 5. 29.

[6] Passio Eulaliæ, P.S. Vincentii Magorum munera.

for centuries in frankincense. In the way of this trade, however much its monopolists may have desired to make a mystery about it, the country from which it was procured must have become known to thousands of persons; and therefore great weight is to be given to the common consent which these passages prove that frankincense was procured from "Arabia," "the Arabians," "Sabæa," "the Sabæans," "Panchaia"[1].

As, however, in ancient times, the whole commerce of the east and west was for centuries poured into and exchanged in the coast-cities of Arabia, a commerce so rich and rare, and which so struck the imaginations of men, that some of the sublimest allusions of the Hebrew prophets are derived from it, and its fame "vibrates in the memory" yet of all the countries of the Mediterranean and Arabian seas, many products of countries further east than Arabia may have been, and indeed were, received in the west or Mediterranean countries as the products of Arabia; but, as to frankincense, it is only necessary to reply here that it is always mentioned as a foreign production in ancient Hindoo books, according to Heeren[2], and that to this day the people in the bazars of Western India say that it comes from Arabia, and that not, I believe, because it is simply the fact, but of the great myth of the ancient commerce of the Sabæans, which still lingers in the east.

The high honour in which the offering of frankincense was held, is shown by its being named as one of the three gifts of the "wise men from the east"[3], the significance of which is well illustrated by the passages in Claudian and A. P. Clemens to which I have above alluded.

In the Revelation, xviii. 11–13, we have another confirmation of the importance of the trade in it when that book was written:—"And the merchants of the earth shall weep and mourn over her [Babylon]; for no man buyeth their merchandise any more: the merchandise of gold, and silver, and precious stones, and of pearls, and fine linen, and purple, and silk, and scarlet, and all thyine wood, and all manner of vessels of ivory, and all manner of vessels of most precious wood, and of brass, and iron, and marble, and cinnamon, and odours, and ointments, and *frankincense*, and wine, and oil, and fine flour, and wheat, and beasts, and sheep, and horses, and chariots, and slaves, and souls of men," . . . .

I believe that the Arabian writers Avicenna, Serapion, Edresi, Abulfeda, and Ibn Batuta all agree that frankincense is produced in the Hadramaut, behind Merbat and Sheba[4]. Serapion and Avicenna, misleading themselves by Dioscorides, say that it is produced in India also[5]. Abulfeda says that frankincense is found nowhere else but in Yemen. Ibn Batuta would appear to have seen the tree at Hafek or Hasik. His words are:—"Leaving Zofar (Dofar, Lee; Sephar of Bible?—G. B.), I proceeded to sea towards Amman, and on the second day put into the port of Hasik, where many Arab fishermen reside.

[1] "I know where the Isles of Perfume are,
Many a fathom down in the sea,
To the south of sun-bright Araby!"

[2] I have it in my note-book that Heeren asserts this, but have failed to verify the note for the purpose of this paper.

[3] Matt. ii. 11.

[4] Bocharti Geo. Sac. Traj. ad Rhenum, 1674; Lugd. Bat. 1692, lib. ii. c. 18.

[5] Bochart, *loc. cit.*; Garcia ab Horto, Aromat. et Simpl. Hist. lib. i. c. 6, Ant. 1579.

We have here the incense-tree. This tree has a thin leaf, which, when scarified, produces a fluid like milk: this turns into gum, and is then called *loban* or frankincense"[1].

Marco Polo[2] writes of the city of Escier or Escher (Sheher, Saher, Sahar):—"This district produces a large quantity of white frankincense of the best quality, which distils, drop by drop, from a certain small tree that resembles the *fir*. The people occasionally tap the tree or pare away the bark; and from the incision the frankincense gradually exudes, which afterwards becomes hard. Even when an incision is not made, an exudation is perceived to take place, in consequence of the excessive heat of the climate."

"The frankincense is so cheap in the country as to be purchased by the governor at the rate of ten bezants the quintal, who sells it again to the merchants for forty bezants. This is done under the direction of the soldan of Aden, who monopolizes all that is produced in the district, and derives a large profit from the re-sale."

Of Duflar (Dofar) he writes:—"Frankincense is likewise produced here, and purchased by the merchants."

Thevet[3] says that frankincense is produced, with myrrh, in the country abont Pecher (Sheher ?) and Fartack, cities of the kingdom of Aden, that there are two sorts (one, which is gathered in the dog-days, whitish, pure, clean cut, and solid, and the other, collected in the spring, which is reddish), and that the tree resembles the resiniferous *firs*. But the figure which he gives of it is of an undoubted *Boswellia*, as figures go in these old books. In the background, it is important to observe, are clumps of *firs*.

Garcia ab Horto[4] says most positively that no frankincense is produced in India, and that all that is used in India, or imported into Portugal, comes from Arabia (he wonders that Dioscorides, followed by Avicenna and Serapion, should say it grows in India), that the Arabs call the darker kinds of frankincense Indian, that there are two kinds of frankincense, one that is produced on the mountains and the best, and the other, which is inferior and dark, produced in the plains, and that the tree is like the mastick,—the figure given of it in this edition being a copy of Thevet's, *without* the background of *firs*.

Gerard[5], merely copies from Thevet.

Clusius[6] merely notes on Garcia ab Horto's account of frankincense the invention of the synonym olibanum for it by Gerard in his translation of Avicenna, published at Venice A.D. 1490:—"The Arabs call it *Loban, unde Gerardus Carmonensis fecit suum Olibanum* (cap. 525, lib. ii. Avisenæ), which is wonderful, when that chapter in the Arabic copy has not *Loban* but *Conder*." But this is not the first use of the synonym olibanum for frankincense. It is used by Pope Benedict IX. in 1033[7].

Stuckius[8] says that frankincense comes from Arabia.

[1] Travels, translated by Lee.

[2] Travels, bk. iii. ch. 40, "On the Province of Aden," Bohn's series. Also Bergeron's Collection.

[3] La Cosmographie Universelle: Paris, 1575.

[4] Aromatum et Simplicium Hist., Ant. 1579, *loc. supra cit.*

[5] The Herbal: London, 1597.

[6] Exoticarum Lib. Dec.: 1605.

[7] Italia Sacra auct. Ferd. Ughello: Ven. 1717. Glossarium Manuale ad Scrip. Mediæ et Infimæ Latinitatis: Halle, 1778.

[8] Sacrorum Sacrificiorumque Gentilium Descriptio: Tiguri, 1598.

ANTOINE COLIN[1] merely translates the Latin epitomes of Garcia, adding an annotation which is an epitome of the statements of Thevetius, and illustrated by a copy of his figure of the frankincense-tree.

In 'Purchas, His Pilgrimes' (London, 1627), NICHOLAS DOVENTON, Captain of the 'Peppercorne,' writes, March 1612:—"The eight and twentieth . . wee anchored in rough ground in seven fathome, a mile and a half westward from Mount Felix" (Mount Elephant of the ancients, Ras Fieluk of the Arabs). "The nine and twentieth in the morning . . . the countrie people brought downe to our men to sell, some store of sheep, small goats, with some small frailes of olibanum and gumme arabick, all which they had at reasonable rates."

And Captain JOHN SARIS, in his Voyages, under March 1, 1611, writes:—"In the evening we had ground, standing in along the land to find the bay of Feluke. . . . Here are gummes of several sorts, very sweet in burning, also fine mats, well requested at Aden, Mocha, and the Indies; for ordinarily the Indian ships touch here both inward and outward, to buy thereof, and of the gummes"[2].

HERBERT[3] writes of Arabia:—"But in the old time these were distinguished into the Sabæi, whence Guilandinus says was the queen that came to hear Solomon's wisdom, and the three Magi who had the honour of presenting their offerings to Christ. And it is not without reason that this part of Arabia abutting upon the Persian Gulf from against the Island of Bahrein, mentioned by Eratosthenes, where the city of Calach was (now called Obollach), as far as Muscat, was the Sabæan land, which, from the abundance of gold there found, was reputed Ophyr, though, indeed, both Sabæa and Ophyr are near Ganges. From the plenty of frankincense and myrrh, it was called *Thurifera Regio*, most abounding near the hilly country of Merbat and Segar (Sheher), neighbouring the land of Hadramat or Atramit, as Pliny and Pomponius Mela (lib. iii. c. 18), thus:—'*Sabæi Arabiæ felicis tenent partem ostio maris Persici proximi Carmaniæ, ubi montes Asabi sunt*:' albeit many contrarily suppose that Saba or Sheba (which Strabo, lib. xvi., calls Metroba) was in the western part of Arabia, near the Red Sea. I take leave to digress a little further. After the confusion of tongues, which was 120 years after the flood" &c.

Of Benjamin, he writes:—"Arabia has good, but Pegu and Siam better."

SALMASIUS[4] says that the word olibanum is from the Greek ὁ λίβανος, and sums up the statements of Theophrastus, Pliny, and the Arabs in favour of Arabia being the land of frankincense.

BOCHART[5] says that frankincense is not obtained from India, or Africa, or Panchaia, or Mount Lebanon, but solely from Saba. Both sacred and profane writers testify to this. The thuriferous region lies between the Sachalitic Gulf and Syagrian promontory; and Cana (Makalla) is the emporium of the trade.

[1] Histoire des Drogues, Epiceries et Simples: Lyon, 1619.

[2] This passage is referred to by Vincent, 'Commerce and Navigation of the Ancients,' Lond. 1807, vol. i. p. 90.

[3] Travels: London, 1677.

[4] Plinianæ exercitationes et de Homonymis Hyles Iatricæ: Traj. ad Rhenum, 1689.

[5] Geographia sacra: Traj. ad Rhenum, 1674, and Lugd. Bat. 1692.

Ovington[1] writes:—"Arabia Felix . . : abounds with several kinds of drugs, with balsam and myrrh, incense, cassia, manna, dates, gold, frankincense, and pearl."

"Dofar . . produces only some olibanum, coco-nuts, and butter."

"Seer (Sheher) . . . is much frequented by ships from several ports, viz. Muscatt, Gombroon, Suratt, and Gella (Zeyla), and some other places on the Abasseen shore, from whence they bring butter, myrrh, and slaves; and those from Muscatt and Suratt transport with them olibanum, and aloes, and what the port affords."

Aden: "they carry nothing from hence but coffee, aloes, olibanum, and myrrh; the last three of which are the products of the country."

Mocha exports "coffee, senna, and some aloes hepatica:" imports "from Casseen [Keshin, near Ras Fartak?] olibanum," "from Socotra aloes," and "from Gella [Zeyla] and other parts of Abasseen myrrh, and from Socachim [Suakin?] elephants' teeth and gold."

Hamilton[2] writes:—"Cassin [Keshin, near Ras Fartak] that lies under the meridian of Cape Guardafoy, and under the prodigious high mountains of Megiddo, on the coast of Arabia." "The product of the country (besides common roots, and fruits, and animals) is myrrh and olibanum or frankincense, which they barter for coarse calicos from India; but they have no great commerce with strangers."

"Nor has Doffar any better trade."

He mentions Mount Felix under the name of "Baba-fileck," or "the Camel's Hump."

Pomet[3] is supposed to assert that frankincense is a product of Mount Lebanon; and he indeed says this of male frankincense; but in a separate chapter on Mocha frankincense he says that it is brought to Europe by the East-India Company, and so called Indian frankincense.

Chardin[4] says "that the frankincense-tree, which resembles a large pear-tree, grows in Persia, particularly in Caramania, on the mountains. You find also there the terebinth-tree, the almond, and the wild chestnut."

Celsius, in his famous 'Hierobotanicon,' comes to the conclusion that Arabia is the native country of frankincense. He quotes from Fragosus:—"It is most true that frankincense does not grow in any part of India, since whatever frankincense is consumed in India, and whatever is conveyed thence to Portugal, is brought out of Arabia, where alone it grows, and is called Lovan. On which account, I believe that writers are mistaken, who consider that it is called Libanum in Greek, and olibanum in commerce, from the fact of its growing in Mount Lebanon"[5].

Lobat[6] says that olibanum is not only a production of Arabia, India, and of Mount Lebanon, but of Western Africa.

Linnæus referred (I take this statement at second hand) frankincense to an unascertained juniper; and scientific botanists after him boldly specified *Juniperus Lycia* as the

[1] Voyage to Suratt (1689): London, 1698.

[2] Account of the East Indies, 1688–1723, in Pinkerton's 'Travels.'

[3] Histoire des Drogues: Paris, 1694; translation, London, 1737.

[4] Voyage en Perse et l'Orient: Amsterdam, 1711.

[5] Olavi Celsii Hierobotanicon, sive de Plantis Sacræ Scripturæ Dissertationes breves: Amstelodami, 1748, pp. 231–246.

[6] Nouvelle Relation d'Afrique: Paris, 1728.

tree; and, in fact, until a very few years ago (1832) *Juniperus Lycia* was generally held to be the frankincense-tree.

NIEBUHR is always cited as an authority in this controversy; and the statement attributed to him is:—"We could learn nothing of the tree from which incense distils, and Mr. Forskal does not mention it." But this is not what Niebuhr says, but only Heron's (Edinburgh, 1792) very free and easy translation of what he says. But even Heron's translation continues, "I know that it is to be found in a part of Hadramaut, where it is called oliban. But the Arabians hold their own incense in no estimation, and make use only of that which comes from India. Probably Arabian incense was so called amongst the ancients, because the Arabians traded in it, and conveyed it from India to the ports of Egypt and Syria."

Now, what Niebuhr says in the 'Description de l'Arabie,' Copenhagen, 1773, is, in epitome, this:—Anciently Arabia was not less celebrated for its incense than for its gold; but all the incense received from Arabia was not produced there. Arrian and others have shown that much was imported from Abyssinia and India, and from beyond it. Indeed it is chiefly cultivated in Arabia, about Merbat, Schähr (Sheher), and the kind called *Liban* by the Arabs, and frankincense by the English, which is the worst of all. The Arabs get other kinds from Abyssinia, Sumatra, Siam, Java, and amongst these what they call Bacher Java, and the English benzoin, and the poorest sort of which is esteemed better than the best frankincense. One may conclude from this, that many kinds passed in ancient times under the names of Arabian incense, although from countries far beyond it. In this way Arabian coffee is called, in Europe, Levant coffee. The Arabs do not set much on their olibanum; for they import the incense of India ["l'encens des Indes" (benzoin ?)] and the mastic of Scio (p. 126).

Moses, he testifies, in Genesis, names the cities of Yemen and Hadramaut, as if he had personally known them. Hadramaut is the Hatzarmaveth of Moses, which signifies, in Hebrew, the Court of Death, and, in Arabic, the Region of Death. In the Hadramaut, Dafar, Merbat, and Hafeck export the best olibanum (pp. 245–255).

BRUCE, in the Atlas to his Travels (Edinburgh, 1805), figures a plant which he says is called *Angouah* by the people about the Tacazze, and believed by the Abyssinians to yield true frankincense; and he adds, "in reality it produces a gum much resembling it." It is undoubtedly the *Boswellia papyrifera* of Richard. But botanists seem never to have given Bruce the credit of the discovery of this plant. Stackhouse[1] lays no stress on the plant, merely observing, "Libanus vel Libanotos Theophrasti. This, according to Sprengel, is the *Amyris Kataf* of Linnæus [Forskål ?]. It is to be regretted that the description of Theophrastus is so incorrect as not to ascertain the point." Royle[2] merely remarks that the *B. serrata* of Roxburgh is not Bruce's plant. Bruce observes that the frankincense land stretches from Abyssinia away to Cape Gardafui[3].

COLEBROOKE, in 1807[4], proved that an exudation allied to frankincense was yielded by the *Boswellia serrata* of Roxburgh, now known under the name of *B. thurifera*, Colebrooke. As soon as Colebrooke's discoveries became known, it was concluded that this

[1] Extracts from Bruce's Travels: Bath, 1815. [2] Pharm. Journal, v. 541; 1845.

[3] Travels, vol. i. p. 356. [4] Asiatic Researches, vol. ix. Calcutta, 1807; Linn. Trans. vol. xv

was the olibanum of commerce, and it was even denied that Arabia yielded any olibanum. But I will not anticipate.

Delile[1], in 1820, described a plant called *Kafal* by the Arabs of Fazogl, *Galgalaan* by the negroes of the country, and *Loban-adan-culán* in Sennar, and named it *Amyris papyrifera*.

In Milburn's admirable work on *Oriental Commerce*, published in 1825, it is stated that *Jedda*, *Aden*, and *Massowah* import benjamin, and *Zeyla* and *Berbera* export olibanum, and that olibanum is procurable in the Persian Gulf.

Of Berbera he writes that "a fair is held here from October until April, and the caravans arriving *from the interior* during that period bring large quantities of gum-arabic and myrrh. Olibanum is chiefly produced on the coast, between 'Barbora,' or 'Burbureea,' and Cape Gardafui, and exported in Arab vessels from a small port near Cape Felix [Mount Elephant of the ancients; Ras Fieluk; Cape Felix, or Felles, of the Portuguese; Jibbel Feel, Capt. Saris; Baba-fileck, Hamilton, *suprà*]. A small proportion of these articles reaches Bombay and Europe; the largest part goes up the Red Sea to Egypt."

Amongst the articles to be obtained at Calcutta and Bombay olibanum is not mentioned by him.

Endlicher, in 1838, described and figured his *Plösslea floribunda*[2], obtained from Fazogl, and which Royle was one of the first to recognize as a *Boswellia*, and which is the same plant as Bruce's "*Angouah*" and Delile's *Amyris papyrifera*.

Wellstead[3], in 1838, and Johnston[4], in 1842–43, both stated that large quantities of olibanum are exported from the Soumali coast. Wellstead says, "two kinds of frankincense are brought here for exportation to Hindostan, one called *Luban*, from Hadramaut, which is a powerful aromatic, used in the temples and houses for fumigation; the other *Luban mati*, less fragrant, but preferred for chewing." Again, "In the mountains behind Saher and Makallah are found dragon's-blood [Bdellium?] and frankincense trees. I have often seen the former, but never the latter."

Haines[5] also did not find the frankincense-tree in his examination of the Arabian coast "commencing from the entrance of the Red Sea, and continuing so far as Messenaad, in latitude 15° 13′ N. and longitude 53° 43′ 25″ E.," and he says that the frankincense exported from Makalla is imported from Berbera.

Cruttenden[6], in 1837, saw the frankincense-tree of Arabia, on his journey from Merbat to Dyreez, the principal town of Dejar, and in 1843 the frankincense-tree of the Soumali country[7]. He is reporting on the Mijjertheyn tribe of Soumalis, and says:—"During the hot season, the men and boys are daily employed in collecting gums, which process is carried on as follows: about the end of February, or beginning of March, the Bedouins visit all the trees in succession, and make a deep incision in each, peeling off a narrow strip of bark for about five inches below the wound. This is left for a month,

[1] F. Caillaud, Voyage à Méroë: Paris 1820, vol. ii.
[2] Iconographia, 119–120; Nov. Stirp. Dec. n. 47.
[3] Travels in Arabia: Lond. 1838.
[4] Travels in Southern Abyssinia: Lond. 1842–43.
[5] Transactions of the Bombay Geo. Soc. xi.
[6] Trans. Bombay Geo. Soc. i.
[7] Trans. Bombay Geo. Soc. vii. 1846.

when a fresh incision is made in the same place, but deeper. A third month elapses, and the operation is again repeated, after which the gum is supposed to have attained a proper degree of consistency. The mountain-sides are immediately covered with parties of men and boys, who scrape off the large clear globules into a basket, whilst the inferior quantity that has run down the tree is packed separately. The gum when first taken from the tree is very soft, but hardens quickly. The flame is clear and brilliant; and the traveller is frequently amused by seeing a miserable Bedowi family, cowering under a wretched hovel, eating their scanty meal by the light of half-a-dozen frankincense-torches[1]. Every fortnight the mountains are visited in this manner, the trees producing larger quantities as the season advances, until the middle of September, when the first shower of rain puts a close to the gathering of that year."

The export, he goes on to say, is in the hands of "those never-failing speculators, the Banians of Porebunder (Kattiawar) and Bombay." At the close of the north-east monsoon they arrive at the coast, and settle at Feluk (Mount Elephant of the ancients, Cape Felix of the Portuguese, and Jibbel Feel of Capt. Saris), Bunder Marayah, and Bunder Khor, and other Bunders. "The Bedowins from the interior immediately visit them; and as there is no one to compete with them, they manage to engross the greater part of the trade." He estimates that the quantity annually exported is:—

	tons.
To Bombay	377
To Red Sea	235
To Arabia	120
Total	732

"The trees that produce *Laban* or frankincense are of two kinds, *Luban Meyti* and *Luban Bedowi*. Of these the *Meyti*, which grows out of the naked rock, is the most valuable, and, when clean packed and of good quality, it is sold by the merchants on the coast for $1\frac{1}{4}$ dollar per frasila[2] of twenty pounds. The *Luban Bedowi* of the best quality is sold for 1 dollar per frasila; of both kinds the palest colour is preferred. The trees vary greatly in height; but I never saw one above twenty feet, with a stem of nine inches in diameter. Their form is very graceful, and when springing from a mass of marble on the brink of a precipice, their appearance is especially picturesque."

He mentions also that myrrh is chiefly brought from Murrayhan in the interior, and sold at Bunder Murraayha, near where he also saw a few myrrh-trees.

In 1843, also, KEMPTHORNE and VAUGHAN made a short journey into the Soumali country, "from Bunder Marayah, the chief town of the Mijjertheyn Soumalis, near Ras Feeluk" (Mount Elephant, ancients; Cape Felix, Portuguese; and Jibbel Feel, Saris). Kempthorne's description of the frankincense-tree, which he saw here on the limestone mountains, three miles inland from Bunder Marayah, I have copied after my botanical description of it below[3]. Royle says[4] that "Bennet identified this plant (which is Crut-

[1] Compare Pliny, *supra*.

[2] Compare Purchas, *loc. supra cit.*

[3] See Trans. Bombay Geo. Soc. vi. and xiii.; Harris, Highlands of Æthiopia, vol. i, 417, 1844; Pharm. Journal, iv. 1844

[4] Pharm. Journal, v. 1845.

tenden's *Luban Meyti* also) with Endlicher's *Plösslea floribunda*, but on an examination of the bark only." Kempthorne says, "During the south-west monsoon, the pastoral tribes in the neighbourhood of Ras Feluk collect large quantities of frankincense, which they barter to the Banians, of whom a few reside in the villages along the Abyssinian coast. Boats from Maculla come and fetch the gums, which are exchanged for a coarse kind of cotton cloth worn by the Soumalis." And again, "I think that the localities from which the ancients obtained their principal supply of frankincense were situated on the almost inaccessible mountains of Adel, in Africa, facing the southern coast of Arabia; for the trees, as we saw them, extended over such a vast tract of land that large quantities of the gum even now must be collected annually, as in the days of the Greeks and Romans. The plant grows at the height of between 2000 and 3000 feet above the sea." He mentions that Cruttenden had before visited the country, but that Vaughan and he were the first Europeans who had ever visited the frankincense-forests of Adel. Vaughan states[1], "The Luban-tree is a native of the eastern coast of Africa, and flourishes on the highlands which intersect the whole of the Soumali country, where I had an opportunity of seeing it in 1843, not far from Cape Gardafui." And he gives the following as the different kinds of Luban found by him in the bazar of Aden :—

Luban maitee, from Bunder Mait, collected chiefly by the Abardagahala Soumalis. *Luban nankur* or *aungure*, from Bunder Aungure and the country of Door Mahomed and the Abardagahala Soumalis. *Luban makur*, from the ports of Ras Rurree, Khor Bunder, Alholu, and Bunder Maryah, and Bunder Khassoom, in the country of the Wursangali and Mijjerthên Soumalis, about Cape Gardafui. This drug is collected in March, April, and May, and chiefly finds its way to Bombay through the *entrepôts* of Maculla and Shehr. *Luban berbera* or *muslika*, collected by the Aial Yunus and Aial Hamed Soumalis, and which is in agglomerated *dark, vitreous tears*, and largely used by the Arabs themselves; and *Luban Marbat*, or *Saharee Luban*, the frankincense of the libanotophorous region of Arabia, the highest-priced of all, and exported in enormous quantities to Bombay.

Richard[2], in 1845, described and figured his *Boswellia papyrifera*, identifying it with Delile's and Endlicher's plants, which are identical with Bruce's *Angouah*. The Abyssinian name he states, on the authority of Dillon and Schimper, to be *Makker*. "It grows on the mountains which encase the Tacazze."

In 1847, Carter published[3] a figure and description of the frankincense-tree of Arabia, with remarks on the misplacement of the libanotophorous region in Ptolemy's geography, a paper which of course decided the vexed question whether Arabia produced frankincense or not, and for the first time accurately fixed the position of the Arabian thuriferous region, but which actually remained unnoticed, until I drew attention to it a few years ago, as will be presently told. He placed it under Colebrooke's species; and hence probably, in part, the reason why it was overlooked; but it was a distinct technical species.

[1] Pharm. Journ. vol. xii. 1853.

[2] Voyage en Abyssinie, pendant 1839–1843, par M. Théophile Lefebre, &c., vols. 4 & 5; Tentamen Floræ Abyssinicæ, auctore Achille Richard, Atlas, tab. 33.

[3] Journal of the Bombay Branch Royal Asiatic Society, vol. ii.

It was desirable to find out where his original specimens were; and on my inquiry he wrote to me, on the 1st of November last, that

"The original drawings of the Arabian frankincense-tree, I sent in to the Government of Bombay, for transmission to the Court of Directors, among seventeen original sketches, and eleven specimens of gums, my gatherings in the south-east coast of Arabia, with short descriptions of each, in April 1848; and, on the 28th of February 1851, I got the following reply through the Bombay Government, extracted from a dispatch of the Court of Directors:—'Great credit is due to Assistant-surgeon Carter,' &c.

"It was from the original sketch that I sent home to the Court that I *traced* the lithograph of the same, which appears with my little memoir on it. But I sent home delicately coloured drawings also."

I applied at the India House, to be shown these specimens and drawings, but was informed that they did not appear to be any longer there.

My next question of Carter was, if he had himself seen the Arabian frankincense-tree *in situ*, or if merely specimens had been collected for him by the Arabs.

His reply, January 28th last [1869], was: "On the 25th December, 1844, I made my first excursion in the south-east coast of Arabia. It was to see the frankincense-trees growing at the foot of the great limestone cliffs, near the village of Merbat. They were then leafless; but the odour of the gum-resin was convincing, even before they were touched. The same was the case with *Boswellia serrata*, which covers the sides of the Ajunta range, which I traversed with Bháu Daji. The whole air was redolent with their fragrance. On the 21st of April 1846, I found the frankincense-tree growing on the *detritus* of the great white limestone cliffs of Ras Fartak, within a few feet of the sea. It was then in full foliage, but without flowers. On the 22nd of May following, a little further to the north-east, I got a Bedoo to go up into the limestone mountains, close to the shore, and bring me some branches in flower. He brought them, with some rooted stems also, which I brought to Bombay, and from which the plant in the Old Gardens at Bombay was obtained. Having specimens of the branches and leaves, which I had myself gathered just a month before, from the trees under Ras Fartak, I compared all, and found all to belong to the same species, and forthwith made the drawings on board, of which you have the lithograph."

Carter, after identifying his plants with Colebrooke's—with a query, however, and a doubt still further expressed in a foot-note—observes, "In addition to India and that part of Arabia which I shall presently point out, the frankincense-tree is found in great abundance in Eastern Africa, on the limestone mountains which extend westward from Cape Gardafui through the country of the Soumalis. I have seen a living specimen in foliage brought from thence, and large quantities of the gum, which is imported at Makalla for re-exportation to India. Both the produce of the tree of Africa and Arabia appear to be the same."

"Ibn Batuta calls the tree *al Kundooroo*. The gum is called by the Arabs *Laban*. The Maharas call the tree *Maghrayt d'sheehaz*, the gum *sheehaz*."

He then epitomizes the account given by Theophrastus of the frankincense hills and the tree and the manner of collecting its gum-resin, adding, "But for the disappearance of the Sabæans and their towns, I could not offer a more accurate description."

"The gum is procured by making longitudinal incisions through the bark, in the months of May and December . . . On its first appearance, the gum comes forth white as milk, and, according to its degree of fluidity, finds its way to the ground, or concretes on the branch, . . . from whence it is collected by men and boys employed to look after the trees by the different families who possess the land in which they grow."

He found the *Moql* or bdellium-tree growing with the frankincense, but not the myrrh-tree, as Theophrastus relates.

"The insalubrity of that part of Arabia . . . . is fabulous . . . It is most invigorating and healthy, the abode of the Bedouins, and the resort of the lowland people of the coast during the hot season."

Of the thuriferous district he writes:—"Coming from the north-east, we first meet with the frankincense-tree on the Sabhan mountains, in latitude 17° 30′ north, and longitude 55° 23′ east [near Merbat?], where the desert ends, and the wooded mountainous region commences; and following the coast, which runs south-west, we find the frankincense exported from the different towns gradually diminishes, after the bay of Al Kammar, until we arrive at Makalla, from whence none is exported from the interior of Arabia, and but little used, except what is brought from the African coast, opposite that town. By the same inquiry we learn that the produce of the Arabian trees is exported in largest quantities from places on that part of the coast which intervene the longitude and latitude mentioned (viz. 17° 30′ north, and 55° 23′ east) and the town of Damkote, in the Bay of Al Kammar, 52° 47′ east longitude [Ras Fartak?]. Between these two points the trees are congregated in two distinct localities—on the summits and sides of the highest range of mountains near the coast, and on the plain between them and the sea; the former is called *Nedjee*, or high land, and the latter *Sahil*, or plains on the coast. The *Nedjee* is about two days' journey from the shore; it is the most elevated portion of the great limestone formation of this coast, which, from a height of 5000 feet here, descends in sudden and lofty steps upon the Arabian Sea. To get to it you first cross the *Sahil*, already mentioned, and then ascend a minor range, which is covered with long grass and trees, and, after passing a less fertile region called the *Găthăn*, at last arrive at the *Nedjee*, where there is no grass, and but few trees besides those which produce the frankincense. The soil is red and sub-argillaceous; and in consequence of its scarcity, the trees are generally found growing out of the crevices of the limestone-rock. It is from this part that the frankincense is chiefly brought, and, as I have before said, that the largest quantities of it are exported from the different towns on the coast, between the longitudes of 52° 47′ and 55° 23′ east." "The libanophorous region therefore lies behind the towns on this part of the coast, where Theophrastus places it, and not as Ptolemy places it, in Oman." I think this is hypercritical on Ptolemy; but it is invaluable as accurately limiting the frankincense-region of Arabia and demonstrating the extreme accuracy of Theophrastus.

That Haines did not find the frankincense-tree on the Arabian coast, between Aden and Makalla, confirms the accuracy of both Theophrastus and Carter.

When I was placed in charge of the Agri-Horticultural Society's "Old Gardens" in Bombay, in 1859, I found the tree which Carter had brought from Arabia growing

there, and labelled, by Stocks, *Boswellia papyrifera*; and in my catalogue of the Government Central Museum, published in 1862, I adopted *Boswellia papyrifera*, Richard, which Royle had called *Boswellia floribunda*, as the source of olibanum; for I had ascertained that *Boswellia thurifera*, Colebrooke, produced none of the olibanum of commerce, but only an oleo-resinous exudation. But I had not seen Endlicher's and Richard's descriptions and figures, nor probably had Stocks; and I therefore asked Colonel (then Captain) Playfair, at Aden, whether he could procure me any cuttings of the African frankincense-tree. Colonel Playfair sent me a large collection of several varieties of dried leaves and of cuttings, accurately labelled with their native names, with samples of the kinds of frankincense which they respectively yielded. At my request, he subsequently sent duplicates of his dried specimens to Kew. On the cuttings which were sent to me striking and leafing, I found that I had three kinds:—*Yegaar*, yielding *Luban maitee*, an undoubtedly new species, and *Mohr Add* and *Mohr Madow*, yielding *Luban sheheri*, the bulk of the olibanum exported from the Soumali country. Judging by the young leaves solely, I should have been inclined to consider Colebrooke's, Endlicher's, Richard's, and Carter's plants, and Roxburgh's *Boswellia glabra* all only more or less variations of one species, and *Yegaar* the only second species. Indeed, if I followed my own erring inclination, I should hold so now.

Amongst Playfair's dried specimens of *Mohr Add* and *Mohr Madow*, were the leaves of a variety of each, which he said yielded an inferior olibanum, called *Luban bedowi*.

Carter's plant never flowered with me, nor until last year would Playfair's. But he had planted duplicates of the cuttings he sent to me, in the romantic little gardens laid out by him near the celebrated tanks of Aden. They had not flowered before he left Aden for Zanzibar; but when passing Aden, in June 1867, he found that one of the plants had flowered, and he sent its flowers to Kew. When I saw these in July 1867, it was not known to which kind they belonged, as Playfair had not picked any leaves with them. I therefore, on my way back to Bombay, in November 1867, visited the gardens, and found from the gardener that it was *Mohr Madow* that had flowered the previous June. Seeing the plants were leafing too much, I left directions to water them less abundantly than they had been, and to send me any flowers that they produced. On reaching Bombay, I also stopped watering the plants in Victoria Gardens, the Agri-Horticultural Society's new Gardens in Bombay; and early in the monsoon of last year *Mohr Add* flowered. In September last, I was again at Aden, and then found *Yegaar* in full bloom. It is from these materials that I have, with Dr. Thomson and Professor Oliver's kind assistance, prepared the descriptions, and Mr. Fitch has drawn the figures, of the three species which I have named:—

Boswellia Carterii (Mohr Madow).
Boswellia Bhau-Dajiana (Mohr Add).
Boswellia Frereana (Yegaar).

In rearranging the genus I have also included Roxburgh's *B. glabra* under Colebrooke's *B. thurifera*.

Mohr Madow I have named as if Carter's plant; that is, as the specimens of his plant have disappeared from the India House, I have described it from my specimens of *Mohr*

Madow. If I did not name *Mohr Madow* as Carter's plant, certain as it is that it is the same species as his Arabian plant, on this being indisputably determined by the receipt of new specimens, it would become absorbed in *Mohr Madow* under its systematic name, and Carter's connexion with his own discovery would be lost sight of[1].

Mohr Add is named after Dr. Bhau Daji, the distinguished Hindu physician of Bombay, well known in Europe also as an oriental scholar, and whose eminent services to his countrymen and city Sir Seymour Fitzgerald has most honourably recognized in making him sheriff of Bombay for the present year.

Yegaar I have named after Mr. W. E. Frere.

In 1867, Mr. Hanbury showed me a most interesting article on frankincense, in the 'Schweizerische Wochenschrift für Pharmacie' of 13th of May 1864, by Dr. Flückiger of Bern, who quotes a large number of authorities, especially German, on this controversy. He had had Carter's plant brought to his notice by Hanbury; and he concludes that it is the same plant as *B. papyrifera* of Abyssinia, and proposes in consequence to include both under the name of *B. sacra*. But Carter's plant is distinct from *B. papyrifera*; and moreover it is now plain that more than one species of African olibanum yields the olibanum of commerce, whereas Dr. Flückiger prematurely includes them all under *B. papyrifera*, a species not known to supply any of the olibanum of commerce. He had heard of the facts ascertained by Colonel Playfair and myself regarding the thuriferous Boswellias of the Soumali country, but only orally, through a mutual friend of his and Carter's, and hence, I believe, the error into which he is led.

Conclusions.

It will, I believe, be now agreed that Arabia produces frankincense, and in the very region generally indicated by the common opinion of the ancient world and so accurately limited by Theophrastus. Now that it has been demonstrated by Carter, that the libanotophorous region lies along the coast of Hadramaut, the agreement between the statements of the Bible, Herodotus, Theophrastus, Diodorus Siculus, Strabo, Pliny, Arrian, Ptolemy, the Arabs, Marco Polo, Bochart, and Celsius is very striking.

It will, I believe, be agreed also, as implied in the more ancient references to Arabia, and expressly asserted by Diodorus, Strabo, Arrian, and others of the ancients, and demonstrated with such fulness by Cruttenden, Kempthorne, and Vaughan, and the overwhelming evidence of modern travellers (beginning with Bruce) generally, that the Soumali country also produces frankincense, and probably the bulk of the olibanum of commerce. The agreement as to the region about Mount Elephant (Ras Fieluk, Cape Felix, Jibbel Feel), between Arrian, Capt. Doventon, and Capt. Saris in Purchas, Milburn, Cruttenden, Kempthorne and Vaughan, is indeed quite startling.

It will be admitted also, I believe, that *Boswellia Carterii* (*Mohr Madow*), which with *B. Bhau-Dajiana* (*Mohr Add*), the source of the bulk of the olibanum of commerce exported from the Soumali country, is the same species as the plant (*Maghrayt d'sheehaz*)

[1] Carter's (the Arabian) plant has flowered since this paper was read; and a figure of it, from the flowers kindly sent to me by Mr. Wellington Gray, B.M., the present Director of the Victoria Gardens, Bombay, is now added, after that of the Soumali *B. Carterii* or *Mohr Madow*.

which Carter found produced the frankincense of the Hadramaut—and also that *Boswellia thurifera* (including *B. glabra*) of India, and *B. papyrifera* of Abyssinia, whilst thuriferous species, are not known to yield any of the olibanum of commerce.

It is very surprising that so great weight of evidence in favour of frankincense being produced in Arabia Felix and the Soumali country should ever have been set aside for the idle fancy that India was the source of the olibanum of commerce. Twenty years ago, it was clearly demonstrated that Arabia produced it, and one at least of the plants which produced it was fully described and figured. The error has proved as inveterate as the fiction that frankincense was yielded by *Juniperus Lycia*. Colebrooke's discovery was in 1807. In volume i. of Woodville and Hooker's 'Medical Botany,' London, 1832, olibanum is still said to be derived from *Juniperus Lycia*; and it is added, "it is brought from Turkey and the East Indies, but that which comes from India is less esteemed." But in vol. ii. *B. serrata*, Rox. (*B. thurifera*, Colebrooke), is adopted as its source, and it is added, in reference to the new view, that olibanum is obtained from India, "but it is also brought from the Levant in casks and chests."

Fleming[1], in 1810, wrote, "That naturalists should have remained in ignorance and in errour, until almost the present day, respecting the tree which yields a substance so long known, and so universally used, must appear not a little surprising. Such, however, is the fact, and the merit of having discovered the true origin of this celebrated incense, is due to Mr. Colebrooke, who has ascertained and proved most satisfactorily, that the olibanum, or frankincense of the ancients, is not the gum-resin of the *Juniperus Lycia*, as was generally supposed, but the produce of our *Boswellia thurifera*."

In Waterson's 'Cyclopædia of Commerce,' in 1847, it is stated, "Olibanum comes from India. An Arabian kind formerly imported from the Levant is now seldom met with, and its origin is a matter of doubt."

Pereira, in the editions of his 'Materia Medica' previous to 1857, says that "olibanum is imported from India, in chests, and that African or Arabian olibanum is rarely met with in this country." But in the edition of 1857, by Taylor and Rees, it is said, "Strictly speaking, there does not seem to be any Indian variety [*i. e.* commercial ?] of this gum, but, like acacia and myrrh, it reaches Bombay from the Persian Gulf." Royle, in all the editions of his 'Manual of Materia Medica,' even in the posthumous edition of 1868, edited by Headland, says that there are two kinds of olibanum:—"Indian, which is the most esteemed," and "is imported in chests chiefly from Bombay; and African, which is no doubt produced on the hills of the Soumali coast westward, from Cape Guardafui, and carried to the Arabian coast, chiefly by native boats from Moculla." In Maunder's 'Treasury of Botany,' London, 1866, edited by Lindley and Moore, it is written, "*B. thurifera* furnishes the gum-resin known as olibanum, which is supposed to have been the frankincense of the ancients. African olibanum, a drug rarely met with in this country, has been conjectured with much probability to be the product of *B. papyrifera*." But the most surprising surrender to this false summons is that of the profession of interpreters of the Bible. Tristram, in his 'Natural History of the Bible,' London, 1867, writes, "Frankincense, the fragrant gum of an Indian tree, procured through

[1] Asiatic Researches, vol. xi.

Arabia. . . . though brought from Sheba, in Arabia, at a very early date. . . . yet we have no reason to believe the frankincense-tree grew in Arabia; at least it cannot be traced there now: and, as in the case of cassia and other spices, the Arabian merchants were not likely to be communicative in the secrets of their monopoly [!]. To the present day the best frankincense used in Turkey is imported through Arabia, from the Eastern Archipelago. It is also largely imported into Europe from Bombay, for use in the Romish and Greek ceremonials, but of inferior quality."

It is, I think, probable that other odoriferous gum-resins, oleo-resins, and balsams may have been confused with frankincense by ancient writers, as by modern ones. Niebuhr expressly confuses benjamin with frankincense, as does also Herbert before him; and this confusion, I believe, underlies the whole error of India being the source of the olibanum of commerce. Milburn and others confuse it with the mastic, which is irregularly imported in very large quantities into Bombay. It has been popularly confused with balm:—

"Let *India* boast her plants, nor envy we
The weeping amber, or *the balmy tree*"[1].

[(*Added* Dec. 3.) So Mrs. Manning, in her 'Ancient India,' vol. ii. p. 348, says "balm and myrrh may or may not have come from India."] And the predisposing cause of all this confusion has been the unfounded belief that Dioscorides says that frankincense comes from India. It is remarkable that the benzoin of Java is said not to be mentioned by any ancient writer; and yet it is inconceivable that such a fragrant balsam should not have been known to them, and I cannot help suspecting that benzoin at least was largely used as frankincense in ancient times. It is used throughout Japan, China, Burmah, Siam, India, and Arabia, at this day, with frankincense. Books say that frankincense is still the sweet perfume "of our catholic churches;" but Stackhouse says that it is not now used, benjamin being substituted for it, an assertion which every inquiry of my own contradicts. In the Malayan language, the same word is used for frankincense and benzoin[2]. Dioscorides, also, as has been shown, distinguishes an Indian frankincense; and so, when Colebrooke's discovery came, it was accepted as settling the controversy. But I question whether some variety of the African frankincense was not the Indian frankincense of Dioscorides.

I have given a few extracts above, showing the change in the trade-routes between Europe and the East; and these changes also help to explain how it has come to be believed that India produces the olibanum of commerce. Errors from such changes are very common in connexion with commercial articles: calumba, East-Indian senna, and balsam of Peru are illustrative instances. The similarity between the Hebrew, Arabic, and Greek names for frankincense and Mount Lebanon probably led to the error of Ausonius, Florus, Pomet, and others, that Mount Lebanon produced frankincense. Celsius quotes an Orphic verse and passages from Euripides and Athenæus which also assert or imply that frankincense was a product of Syria. And the error seems to

[1] "..... lacrymatas cortice myrrhas."—*Ovid.* "The Bee and the Orange-Tree," Fairy Tales, D'Aulnoy, trans. Planché: Lond. 1855.

[2] Marsden's Dict. of the Malayan Language; Crawford's Grammar and Dict. of the Malay Language.

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survive in the nations of the Mediterranean shores; for at the Universal Exhibition of Paris, in 1867, I saw several bottles of frankincense labelled "olibanum, so called because it comes from Mount Lebanon." I also saw there aconite, labelled "Aconitum Nepaullus, so named because its root is the famous poison of Nepaul."

The 'Oxford Encyclopædia' says that olibanum is *quasi* Oleum Libani, being distilled from the bark of a tree growing on Mount Lebanon!

It would be presumption in me to enter into the etymology of the synonyms of frankincense. I have been unable even to discover when the English word frankincense came first to be used[1]. But I cannot help asking if *thus* and *tus* are really the same word—why the Italian for frankincense should be *olibano*, as if formed from the Greek or Arabic—if there be any connexion, and what its significance may be, between the Arabic words "Cunder," "Al-Kundooroo," and Sanscrit "Cunduru," for frankincense, and the Greek χόνδρος—and why the Bay of Al Kammar is so named.

Burton[2] mentions that "*Lubban*" is the Soumali for milk, and a term of reproach. It will have been observed that the names of the different varieties of Soumali frankincense are identical with the names of the Bunders from which they are exported. Have the Bunders given their names to the varieties of frankincense, or these to the Bunders? Cruttenden says that the myrrh of the Soumalis comes from a place in the interior of their country called Murrayhan, and is exported from Bunder Murrayha—with which name no variety of frankincense corresponds. Does this indicate any etymological connexion with myrrh, the links of which the Soumalis themselves have lost? Also, what is the derivation of the name of the Soumali port of Berbera? The correspondence between some of the synonyms of frankincense and the words used in different languages for the slaying or burning of sacrificial victims is very interesting. But I have only to observe, in connexion with this, two things that have always struck me in Bombay, viz. that the burning of the dead, in the form of the pyre, and the manner in which the body is burned, very forcibly suggests that the practice is derived from human bloody sacrifice, and that the use of sweet odours, in religious rites generally, originated in sanitary precautions. They do not merely mask bad smells, but correct them; and they wonderfully refresh the spirits from the depression which they fall into in crowded places like churches. They also drive out vermin. Nothing so quickly clears your bed in Bombay of mosquitos as burning a little olibanum or myrrh in it. The Protestant churches there are

[1] Minsheu, London, 1599, has "frankincense—encensio." Cotgrave, London, 1632, has "frankincense—encens. F. in drops—*oliban*." Steph. Skinner, M.D., Etymol. Ling. Angl., London, 1671, has "frankincense, thus, *q. d.* Incensum, *i. e.* Thus libere seu liberaliter, ut in sacris officiis par est, adolendum." Rob. Brady, M.D., 'An Introduction to the Old English History and Glossary,' London, 1684, has no mention of frankincense. Gower, in his story of Leucothea, from Ovid's "Methamor," turns her "into a flour was named gelde" (Confessio Amantis, Pauli, ed. Lond. 1857, lib. v.).

[2] 'First Footsteps in East Africa,' London, 1856. In the preface to this work, Burton says that an expedition into the Soumali land was first proposed by Sir Charles Malcolm in 1849, and that the command of it was offered to and accepted by Carter in 1851, but that after Sir Charles Malcolm's death the project was given up; and that when Burton proposed his expedition in 1854, Stocks was appointed to it as botanist, but died before it started. The *savans* who went with the "Abyssinian Army" had no time for work, so swift was Lord Napier's march to Magdala and back.

infested by mosquitos, as by a plague; and I was often asked how to get rid of them, and always answered that the ugly and irreverent punkahs were of no use, and that the only remedy was the immemorial and most beautiful rite of burning frankincense. A pot of holy basil is placed before every Hindu home; and the mother of the house may be seen every morning, after having ground the corn for the day, and performed her simple toilet, walking round and round the four-horned altar, on which the pot of holy basil is set, invoking the blessings of heaven on the father of her children and on them.

DESCRIPTIO.

Genus Boswellia.

Roxburgh, Pl. Corom. iii. p. 4, t. 207; Benth. & Hook. Gen. Plant. i. p. 322. [*Libanus*, Colebrooke in As. Res. ix. p. 377, t. 5. f. 1. *Plösslia*, Endlicher, Nov. Stirp. Dec. 47; Iconog. t. 119, 120.]

Calyx parvus, plerumque 5- interdum 6- non sæpe 7-, rarissime 4- v. 10-dentatus, persistens. *Petala* tot quot calycis divisiones, basi angustata, patentissima, imbricata. *Discus* annularis, crenatus, campanulatus v. explanatus. *Stamina* sepalis duplo numerosiora, plerumque 10, brevia, basi disci inserta, alterna interdum breviora. *Ovarium* 3-, creberrime 4-, interdum 5-loculare; stylus brevis, stigmate 3-, 4- v. 5?-lobo; ovula in loculis 2, pendula. *Drupa* 3-, 4-, 5-gona, 3-, 4-, 5-valvis, valvis a pyrenis secedentibus; pyrenis osseis, 1-spermis, ab axi persistente solutis. *Semina* compressa, pendula, margine membranaceo, testa membranacea; cotyledones contortuplicatæ, multifidæ; radicula supera.

Arbores cortice sæpe papyraceo, thuriferæ. *Folia* decidua, apices versus ramulorum conferta, patentia, alterna, imparipinnata, foliolis oppositis, serratis v. integerrimis. *Racemi* v. *paniculæ* axillares v. terminales, simplices v. compositi. *Flores* albi, v. rubicundi, v. virides, v. vix luteoli, v. cerei.

Species 5, Nubiæ, Abyssiniæ, Berberæ, Arabiæ, Indiæque incolæ.

Sectio I. *Plantæ plus minus pubescentes, disco campanulato.*

Subsectio *a*. *Racemi simplices.*

1. Boswellia Carterii, Birdwood, n. sp. (Tab. XXIX. et XXX.)

Diagnosis.—*Ramuli* terminales, pubescentes vel tomentosi; *foliola* 7–10-juga, ovato-oblonga, undulata vel crenato-undulata, late rotundata vel basi truncata. *Racemi* simplices, fasciculati, foliis breviores. *Fructus* ¼ ad ½ poll. longus, obovato-obtusus.

Carter, Journ. Bombay Br. Roy. As. Soc. ii. 1847. *B. thurifera*, Colebrooke?

Habitat in montibus Soumali, "Mohr Madow" incolarum, *Playfair*; et in montibus Hadramaut in Arabia, "Maghrayt d'sheehaz" apud Maharas, *Carter*.

Descriptio.—Arbor parva; petiolus pubescens; foliola aut crenato-undulata et omnia pubescentia, aut obscure serratula vel integerrima et glabra supra, et velutina interdumque pallidiora infra, longa circa 1½ poll. et lata circa ¾ poll., foliolo terminali sæpe grandiore. Corolla patens, petala alba vel cerea, discus roseus, ovarium disco carnoso roseo arcte adpresso semiimmersum.

Remarks.—The above description is taken from the specimens of leaves collected for Playfair from the "Mohr Madow" of the Soumalis, and the young plants growing in

the Victoria Gardens from cuttings of the same, and the flowers gathered by Playfair in June 1867 from the young plants growing in the Aden Garden from cuttings of the same, and sent by him to the Herbarium at Kew.

The tree found by Carter growing in the limestone formation about Merbat and Ras Fartak, the "Maghrayt d'sheehaz" of the Maharas, is probably a smaller tree in habit. The plant which he brought from the Hadramaut to Bombay, is to this day growing there in the Victoria Gardens; and whilst it is almost impossible to distinguish its leaves from those of the "Mohr Madow" of the Soumalis, except from their being smaller and more crumpled, it is not more than half the height of the plants of "Mohr Madow" propagated in the Victoria Gardens from the cuttings sent to Bombay by Playfair, and which are already about 9 feet high. In "Maghrayt d'sheehaz," the leaves have sometimes five pairs only of leaflets.

Playfair's dried specimens of leaves of "Mohr Madow," sent to Kew and Bombay, include two very distinct varieties,—one crenate, undulate, and pubescent on both sides; the other undulate and obscurely serrulate or almost entire, and velvety and paler below and glabrous above. The plants of "Mohr Madow" in the Victoria Gardens and in Playfair's Garden at Aden have as yet shown only the former variety of leaf, and the plant "Maghrayt d'sheehaz" in the Victoria Gardens never has shown any other; but from the analogy of *B. thurifera* and *B. Bhau-Dajiana* ("Mohr Add") I am led to believe that the two kinds of leaves included in Playfair's dried specimens of "Mohr Madow" are only varieties of leaf of one species, and not leaves of two distinct species of *Boswellia*. I have therefore included the description of both leaves in my description of *B. Carterii*, but *not without uncertainty*.

2. Boswellia Bhau-Dajiana, Birdwood, n. sp. (Tab. XXXI.)

Diagnosis.—*Ramuli* terminales, modice puberuli vel glabri; *foliola* 7–10-juga, oblongo-lanceolata vel oblonga, late rotundata vel basi truncata, aut serrata et pubescentia, aut obscure serrulata et infra incana, supra glabra. *Inflorescentia* in simplicifasciculatis racemis. *Fructus* immaturus oblongo-contractus basi.

Habitat in montibus Soumali, "Mohr Add" incolarum, *Playfair*.

Descriptio.—Arbor parva; folia aut pubescentia, foliolis serratis, aut supra glabra et infra incana foliolis obscure serratulis vel integerrimis, longa 1 poll. ad 1½ et 2 poll. et lata ⅓–½ poll.; 5 vel 6 racemi in quoque fasciculo, foliis paulo breviores; flores numerosissimi, corolla vix patentissima, petala alba v. viridula; discus valde pubescens, virescens, ovarium disco concavo haud adpresso semiimmersum; drupa subclavata.

Remarks.—Playfair's dried specimens of leaves of "Mohr Add," sent to Bombay, include two distinct varieties, the leaflets in one being serrulate and downy, in the other obscurely and remotely serrulate or entire, and hoary beneath, and glabrous above. The latter is the only variety of leaf sent by him to Kew. But in one of his dried specimens of "Mohr Add" sent to Bombay, both these varieties of leaf are seen in the same specimen. The plants in the Victoria Gardens all showed the pubescent and serrate variety of leaf until last year, when one threw out both the varieties of leaf described, and a third variety also of intermediate character. The plant from which I gathered the flower

represented in my plate of *B. Bhau-Dajiana* showed at that time only the serrate and pubescent variety of leaf; but I have figured beside it two other varieties of leaves which I subsequently found *either on this same plant, or other plants of the same species growing near it. It would be more satisfactory if I were less uncertain on this point,* especially as my ground for including the two kinds of "Mohr-Madow" leaves sent to me by Playfair under the species *B. Carterii* is the all but absolute certainty that analogous varieties of leaf are produced by *B. Bhau-Dajiana* or "Mohr Add." It must be distinctly borne in mind, therefore, that with the leaves no flowers have ever been seen of the variety, either of "Mohr Madow" or "Mohr Add," in which the leaflets are more or less entire, and hoary below, and glabrous above, and that it may be an error to include them as varieties respectively of *B. Carterii* and *B. Bhau-Dajiana.* But analogous variations of leaf are conclusively authenticated in the case of *B. thurifera,* infrà.

The serrate downy variety of leaflet in *B. Bhau-Dajiana* is very like the young leaflets of *B. Carterii*; but the leaflets in the latter, young and old, are always more or less undulate, whereas in the former they are always quite flat. In the former, also, the leaflets are narrow and more lanceolate, in the latter broad and more oval; and in the mass of foliage these differences make a distinction.

B. Carterii [*i. e.* "Mohr Madow"] and *B. Bhau-Dajiana* ["Mohr Add"] yield the bulk of the olibanum exported from the Soumali country under the name of "Laban-Sheheri," "possibly," writes Playfair, "because it is principally taken to Sheherr and Makalla markets." Vaughan[1] says "Luban Shaharee" is the term given to Arabian frankincense, which is also yielded by *B. Carterii* [*i. e.* "Maghrayt d'sheehaz"]. Both the glabrous-above hoary-beneath variety (?) of *B. Carterii* [*i. e.* "Mohr Madow"] and of *B. Bhau-Dajiana* ["Mohr Add"] yield, according to Playfair, the "Luban Bedowi" of the Soumalis, which is also mentioned by Cruttenden, but nowhere by Vaughan.

Subsectio *β. Racemi compositi.*

3. BOSWELLIA PAPYRIFERA, Richard, Tent. Flor. Abyss., Voyage en Abyssinie par Lefebre, &c., iv. p. 140, tab. 33.

DIAGNOSIS.—*Foliola* 4–10-juga, pubescentia. *Inflorescentia* racemosa, racemis paniculatis.

Amyris papyrifera, Delile, Cent. Plant. d'Afrique; Cailliaud, Voyage à Méroé, ii. p. 293.
Plösslea floribunda, Endlicher, Nov. Stirp. Mus. Vind. Dec. no. 47, tab. 119, 120.
Bruce, Travels, vii. p. 334, tab. 48, "Angouah."

Habitat in Senaar et Soudan, et Gondar, in convallibus fluviorum Taccaze et Mareb, "Angouah" incolarum, *Bruce*; "Kafal Galgalaam" et "Loban-adam-coulan," *Delile*; "Makker," *Dillon* et *Schimper* apud *Richard.*

Descriptio.—Arbor magna; foliola lanceolata, acuta, dentata, longa 1 poll. ad 2 et 3 poll.; calyx longe dentatus; corolla reflexa; petala longa, reflexa; pistillus basi contractus; drupa clavata.

Remarks.—Of the tree named "Angouah" in Bruce's 'Travels,' he says, "The Abyssinians believe it to be that which bears the true frankincense; in reality it produces a

[1] Pharm. Journ. xii. *sup. cit.*

gum much resembling it." Richard says of *B. papyrifera*, "It distils a resin which, when burnt, gives the odour of the incense of India, which, indeed, as every one says, is produced by another species of the genus, named *B. serrata*, Roxb."

4. BOSWELLIA THURIFERA, Colebrooke, Asiatic Researches, ix. p. 377, t. 5.

DIAGNOSIS.—*Foliola* 8–14-juga, dentata, serrata, vel plus minus obscure et remote serrulata, pubescentia v. glabra. *Inflorescentia* racemosa, racemis compactis, plerumque dense compositis, foliis multo brevioribus. *Fructus* late ellipticus, triquetrus, basi vel apice non contractus.

B. serrata et *B. glabra*, Roxburgh, Flor. Ind. ii. p. 383, 384.

B. glabra, Roxburgh, Cor. ii. t. 207.

Var. α. Foliola ovato-oblonga, truncata vel late rotundata basi, serrata, infra pubescentia.

Var. β. Foliola lineari-lanceolata, oblique contracta basi, nonnunquam obscurissime vel remote serrulata, propemodum glabra.

Habitat in montibus Indiæ tropicæ, "Salai," "Saleh" incolarum; Oude et Rohilcund, *Royle*; Behar, *Hooker*; Concan, *Stocks*; Kattyawar, Khandeish, *H. M. Birdwood.*

Descriptio.—Arbor parva; petala patentia, infra pubescentia, valde rosacea, v. albida; stamina alterna breviora; discus ruber, v. inconspicuus.

Remarks.—The natives of India recognize the two varieties of this plant, of which Roxburgh made two species, and distinguish between their gum-resins. What I have seen of it has been either stalactiform, like the runnings of a wax candle, or in small tears, and always so soft that, when kept in a bottle, in a short time it has run into an oleo-resinous mass, with the smell of frankincense, but more turpentiny. I often and perseveringly tried to get regular tears of olibanum from this plant, but never succeeded in getting anything else than soft, oleo-resinous "runnings" from it, which, even after months' exposure on the trunk, still remained quite soft.

In Khandeish the olibanum produced by this plant is sold under the name of "Dup-Salai" [*i. e.* incense of Salai] in the village bazars. But I have never myself seen it exposed for sale. I have had samples sent to me from all parts of India, and all soft and always melting at last into a mass.

The most remarkable character of this plant is the way in which its leaves and *flowers* vary. Sometimes the inflorescence is in loose cymes, sometimes gathered into a knotty head or capitulum. In a plant brought by my brother from Kattyawar, the petals were reduced to mere scales, the disk very fleshy, red, and prominent, and the stamens tending to abortion.

Sectio II. *Frutex glaber, glaucus, disco explanato.*

5. BOSWELLIA FRERIANA, Birdwood, n. sp. (Tab. XXXII.)

DIAGNOSIS.—*Folia* omnia glabra et glauca; foliola 3–6-juga, late ovata, elliptica, valde obtusa utrinque, undulata. *Inflorescentia* in racemis compositis, foliis multo longior. *Fructus* ovato-oblongus.

Habitat in montibus calcareis Soumaliensis regionis prope "Bunder Murayha," *Cruttenden, Kempthorne,* et *Vaughan*; "Yegaar" Soumaliensium, *Playfair.*

Descriptio.—Arbor parva; folia et flores omnia citrum et terebinthum grate redolentia; corolla valde et rigide patens, stellata; petala basi contracta, et acuta, smaragdina; discus explanatus; stamina circa marginem inserta, rigide erecta in floribus recentioribus, et super disco supine jacentia (velut radii rotæ) in deflorescentibus; antheræ rubræ; pistillus omnino liber et super discum conspicue elevatus, velut metula.

Remarks.—This is a strongly marked species, the source of the "Louban Maitee" of the Soumalis. It is unmistakably this plant which Kempthorne describes. It is evidently also Cruttenden's "Luban Meyti."

Kempthorne says, "The tree is one of the most extraordinary plants I ever saw, quite a *lusus naturæ* of the vegetable world, for the trees actually grow out of the sides of the almost polished rocks. . . . . The trees were about 40 feet high, the stem was about 2 feet in circumference, rising straight up, with a bend outwards of 6 or 7 inches. They are attached most firmly to the rocks by a thick oval mass of substance, about a foot or so in diameter, something resembling a mixture of lime and mortar. Branches spring out rather scantily at the top, and extend a few feet down the stem; the leaves are 5 inches or so long, and 1½ broad, narrowing and rounding towards the point, but not serrated at the edges; the upper surface is of a rich dark shining green, while the lower is of a lighter hue; they are thin and smooth, and crimped like that beautiful species of seaweed so often found on the coast of England. The tree has four layers of bark, the outer being coarse and loose, like that of the beech, while the next two are as it were glued to the trunk and delicately fine, resembling oiled paper or gold-beater's skin, and of a bright amber-colour; this bark is perfectly transparent, and can be stripped off easily in large sheets; the natives use it for writing on; the inner bark of all is an inch or so in thickness, adhering closely to the stem; it is tough, not unlike leather, and striped red and white, and yields a strong aromatic perfume. The timber is white, soft, porous, and of little use, except as firewood. A deep incision into the bark causes the oderiferous gum to exude in large quantities, which is of a milky white, and of the consistency of honey; but it soon hardens by exposure to the atmosphere. It is a remarkable fact that not a single frankincense-tree did I perceive growing upon any other rocks than those of almost pure limestone . . . . It is my opinion that the trees on the Adel coast are different from the species as described so ably by Dr. Carter" (Trans. Bombay Geo. Society, xiii. 1857). This description of Kempthorne's well shows how we should understand the descriptions of old writers. The present Governor-General of Mozambique informed me, quite in the style of Sir John Maundeville, "that copal grew in the earth just like potatoes."

Vaughan writes:—"The hill-ranges on the eastern coast of Africa are composed entirely of white limestone, in some parts so compact as to resemble limestone. This appears to be the soil most genial to the tree, and in no instance did I find it growing in sand or loam. The tree is first met with at a few miles inland from the coast, and at an altitude of about 300 feet above the level of the sea. Its appearance is strikingly singular, seeming at first sight to be destitute of roots and clinging to the hard uncreviced rock by masses of a rhomboidal and fantastically shaped wood with the most obstinate adherence. The stem is nearly at right angles with this substance, ascending almost

invariably in an upright direction, and attaining the height of from 12–15 feet. At the base the circumference is equal to that of a man's thigh, gradually tapering towards the top, where it shoots off its branches and leaves" (Pharm. Journ. and Trans. xii. 1853).

As I saw this plant in Playfair's garden at Aden in September last, in young leaf and covered with bloom, I was much struck by its elegant singularity. The long racemes of green star-like flowers, tipped with the red anthers of the stamens (like aigrettes of little stars of emerald set with minute rubies), droop gracefully over the clusters of glossy glaucous leaves; and every part of the plant (bark, leaves, and flowers) gives out the most refreshing lemon-like fragrance.

It gave me the most lively pleasure to find the flowers which I had been so long seeking of so charming an originality, and in such a romantic spot; for Playfair's garden is a mere angle[1] in the shadow of two pumice rocks, which tower hundreds of feet above it, guarding in their shadows[2] the store of water for the garrison and town; and green leaves, shade, and water make Paradise in the east.

[1] "..... et quod
Angulus iste feret piper et thus ocius uva."
Hor. Epist. lib. I., xiv. 22–23.

[2] Herbert, Travels, Lond. 1677, describes Aden as "a town low in its situation and sulphureously shaded by the high and barren mountain Cabobarra, whose brazen front so scorches this miserable place."

Tab. XXIX. *Boswellia Carterii*—"Mohr Madow."
XXX. *B. Carterii*—"Maghrayt d'sheehaz."
XXXI. *B. Bhau-Dajiana*—"Mohr Add."
XXXII. *B. Frereana*—"Yegaar."

POSTSCRIPT.

CARTER's plant ("*Maghrayt d'sheehaz*") was not before me when I was preparing this paper (see pp. 138, 139), and my description of *B. Carterii* was, and is, the description of "*Mohr Madow.*" A flowering specimen of "*Maghrayt d'sheehaz*" was subsequently received from Mr. Gray, B.M., the present Director of the Victoria Gardens, Bombay, when it was found that in it *the stamens are inserted into the side of the disk,* but it was too late to add the character to the description of the species *Boswellia Carterii* and of the genus. This character therefore distinguishes the Arabian (*Maghrayt d'sheehaz*) from the Soumali (*Mohr Madow*) variety of *B. Carterii.*

G. B.

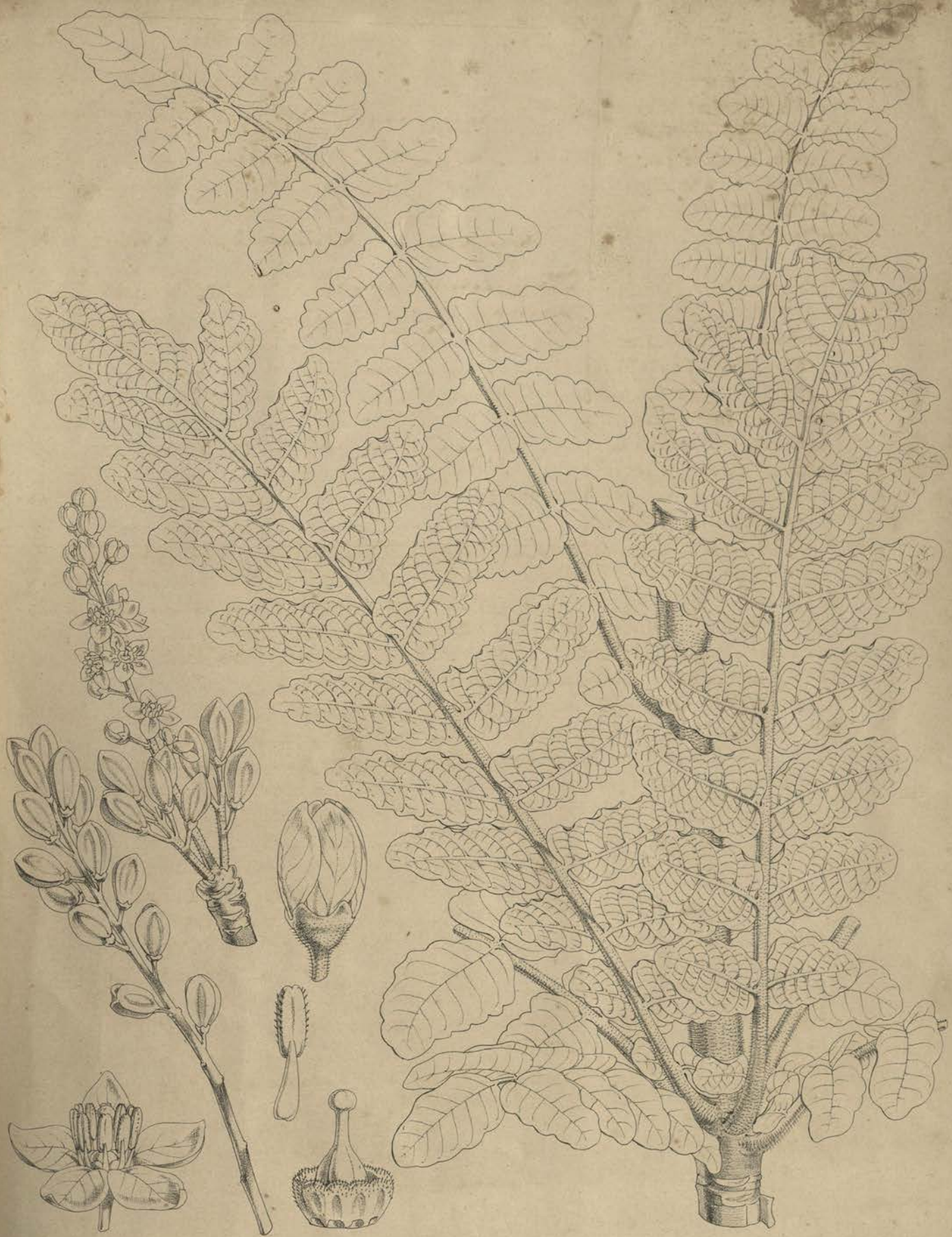
Birdwood might also have quoted Virgil as to "thura".—

Hic segetes, illic veniunt felicius uvæ.
Arborei fetus alibi atque injussa virescunt
Gramina. Nonne vides, croceos et odores,
India mittit ebur, molles sua thura Sabæi;

Georgicon I. lib. 1. 54/57.

T. Iridifolia 25.1.77.—

Gen. "Boswellia"—Nat. Or. Amyridaceæ



W.H.Fitch del. et lith.

J.N.Fitch imp.

Boswellia Carterii Birdwood.

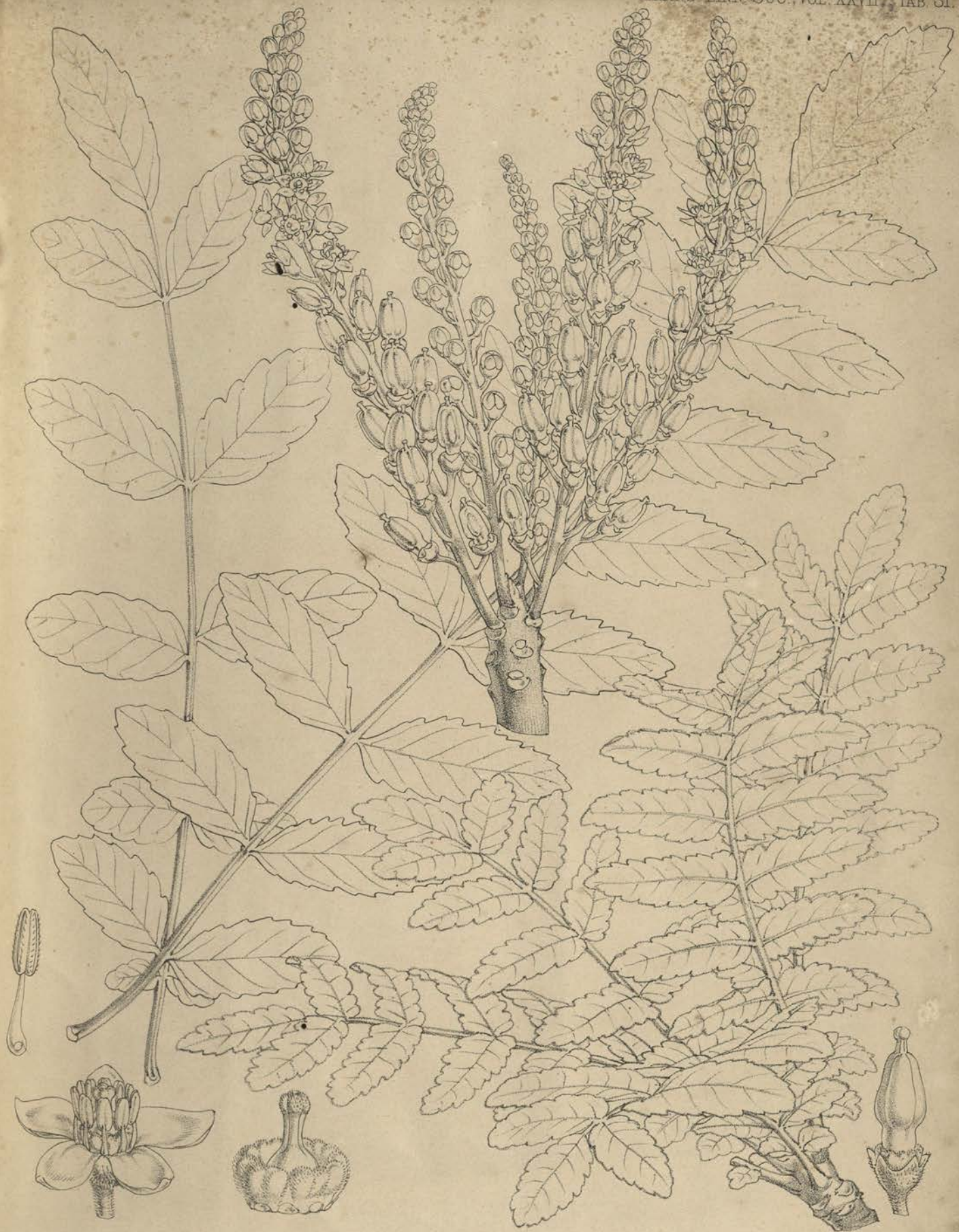
Mohr Madow, of the Soumalis. — Playfair.

W.H. Fitch, del. et lith.

J.N. Fitch, imp.

Boswellia Carterii. Birdwood.

Maghrayt d 'Sheehaz, of the Maharas. Carter.



W. H. Fitch, del. et lith.

J. N. Fitch, imp.

Boswellia Bhau Dajiana. Birdwood.

Mohr-Add, of the Soumalis. Playfair.

W.H. Fitch, del. et lith.

J.N. Fitch, imp.

Boswellia Frereana, Birdwood.
Yegaar, of the Soumalis. – Playfair.

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